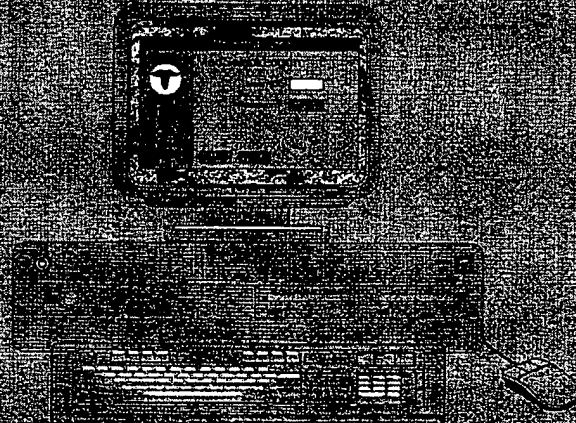


Exhibit A

■  
**Functional  
Specification  
(Software)**

SelecTrac



MedSelect  
A Division of Medtronic

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# **System Functional Specification**

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## **1.1 Introduction**

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The System Functional Specification defines as completely as possible the specific tasks that the SelecTrac-CL and SelecTrac-Rx systems perform. It is the blueprint that is used to program the systems and to verify that the systems satisfy the criteria used to define them.

SelecTrac-CL and SelecTrac-Rx are both designed to store, count, and dispense supplies (such as catheters, guides, sheaths, etc.) and medications (such as syringes, vials, ampoules, packaged solids, etc.).

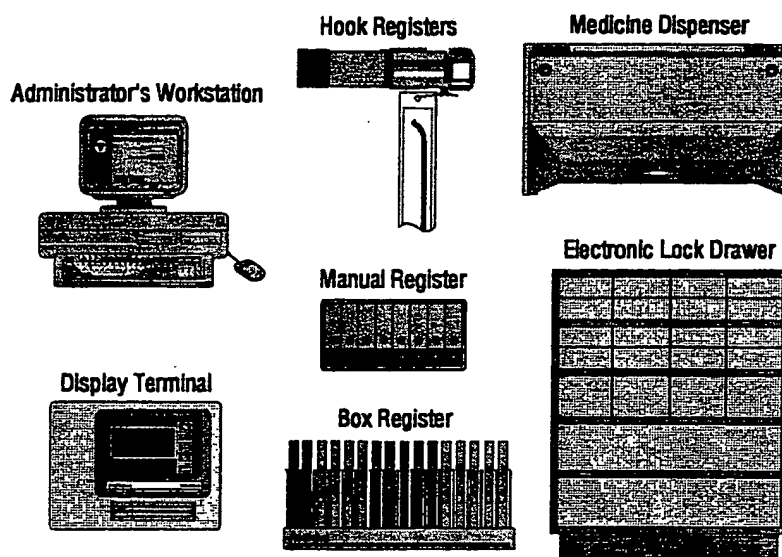
Chapter 1.2 explains the general functions of the SelecTrac systems.

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## 1.2 System Function Overview

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The SelecTrac Systems can be used separately or in conjunction with each other. This is accomplished in the logical database design which allows the products to share a common physical database structure.



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**Figure 1.2-1. *The SelecTrac System***

The SelecTrac-CL system monitors the storage and utilization of supplies for Cardiac Labs. It tracks this inventory by using intelligent hooks, box registers, manual registers and manual data entry.

The SelecTrac-Rx system monitors the storage and utilization of medicines and controls the dispensing of these medicines for Nursing Stations and other hospital areas. It uses medicine dispensers (vials and solids), electronic lock cabinets (ELCs), and manual data entry to provide this functionality. A network link to the Hospital Information System (HIS) delivers orders from the pharmacy to the nursing station.

Both systems provide data forms for user data entry and reporting. They also have internal diagnostic capability. See Appendix 1 for a definition of each component of the SelecTrac Systems.



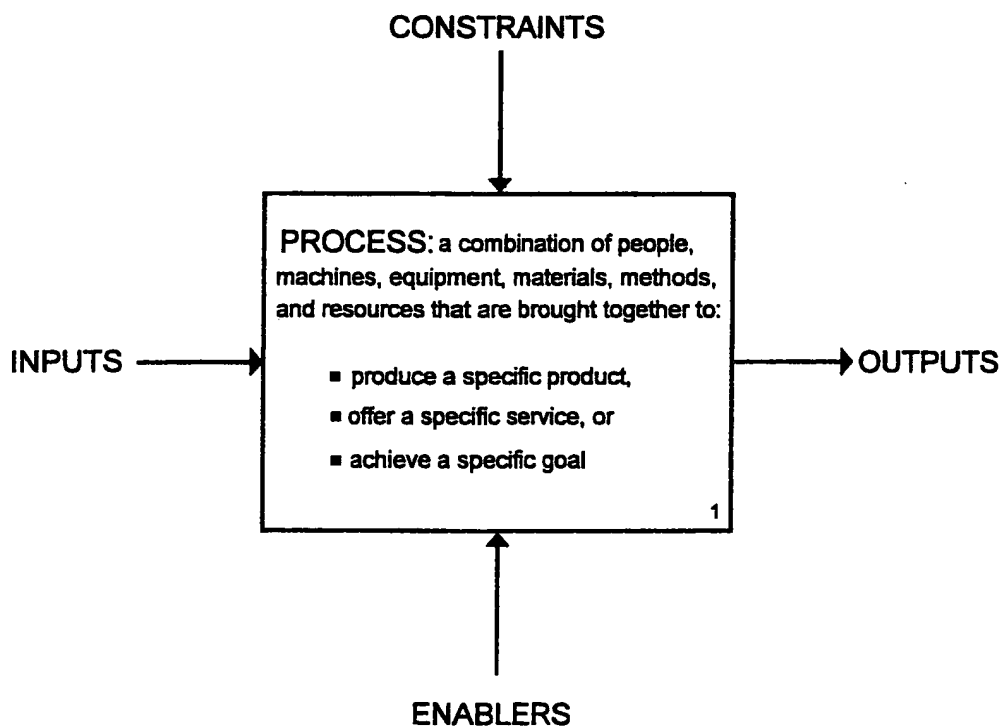


### 1.3 Functional Models

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This chapter contains models that demonstrate the specific functions of the SelecTrac systems. IDEF0 diagrams are used to represent the inputs, outputs, constraints, and enablers on a specific functional procedure.

Figure 1.3-1 demonstrates how a typical IDEF0 diagram works.



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**Figure 1.3-1. IDEF0 Model**

Consecutive processes are numbered in the lower right hand corner of the process box and are grouped together in a node; each node contains a series of related processes. A node may be decomposed (expanded) to a greater level of detail.

An explaining page of text accompanies each IDEF0 diagram.

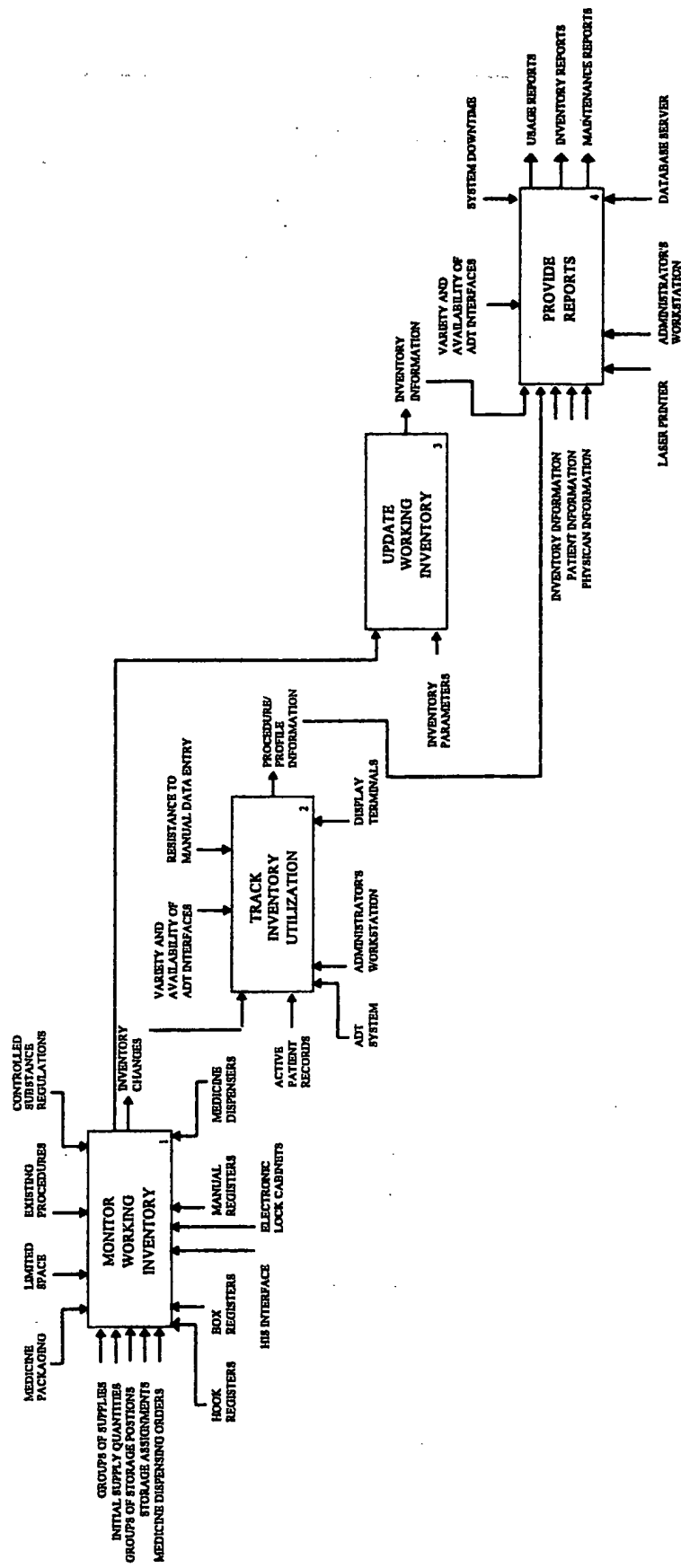


Figure 1.3-2. *SelectTrac System*

*Node A0*

## **Node A0: SelecTrac Systems**

**Figure 1.3-2** shows the overall functions of the SelecTrac systems. Data is gathered by the SelecTrac systems in the following ways:

- 1) Automatic Sensor Detection
- 2) Interface to a hospital's Hospital Information System (HIS)
- 3) Manual input through the Administrator's Workstation (AWS)

The SelecTrac systems strive to minimize the amount of data that must be entered manually. However, the SelecTrac systems provide the capability to enter all data manually in the event that the HIS system is unavailable or a SelecTrac system component fails.

### **Process 1: Monitor Working Inventory**

All inventory changes are monitored and recorded. Inventory changes are determined automatically by hook registers, box registers and medicine dispensers. Inventory changes at the manual registers are determined by the user pushing the appropriate button. Inventory changes at the electronic lock cabinets must be entered manually at a display terminal. Medicine dispensers will only dispense for authorized users. Supply positions may be grouped together for inventory calculations.

### **Process 2: Track Inventory Utilization**

All inventory changes will be assigned to an active patient chart (the opened patient chart that has been selected at the Display Terminal). If there is no active patient chart when an inventory change occurs, it is assigned to an Overhead account. The event may be reassigned to an open patient chart from the Administrators Workstation at a later time.

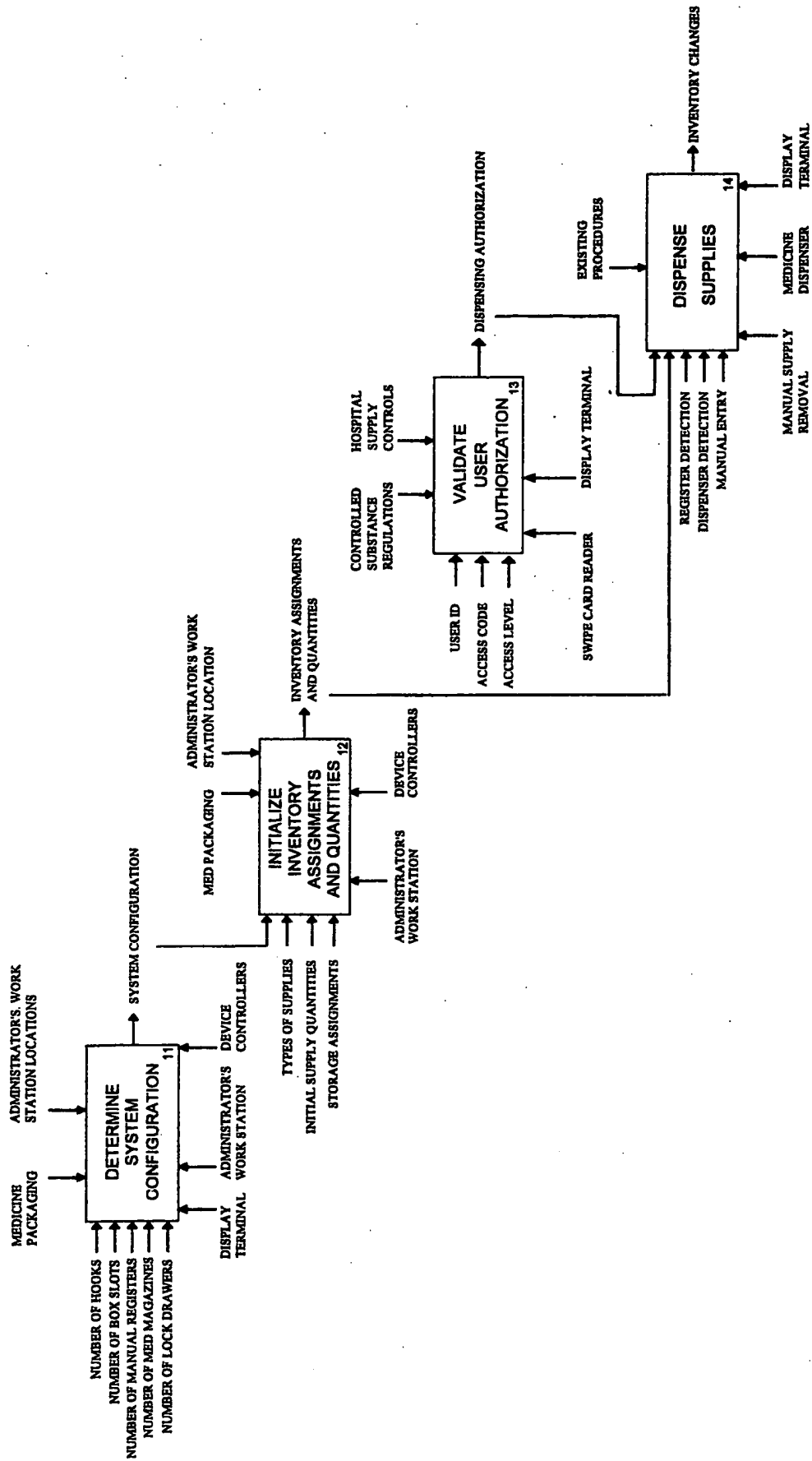
### **Process 3: Update Working Inventory**

All inventory changes will be updated (posted) to working inventory quantities. Working inventory quantities are kept for each storage position and each storage position group, and system-wide for each supply. Warnings are automatically generated when the quantity at a storage position falls below the minimum quantity assigned to that position and when the system-wide quantities of a supply fall below the par value for that supply.

### **Process 4: Provide Reports**

The SelecTrac systems provide 3 categories of reports:

1. Usage Reports: by Patient, Physician/Procedure, User, and Location
2. Inventory Reports: by Location, Summary, Below Par, and Restock by Location
3. Maintenance Reports: Diagnostics, Failures, etc.



**Figure 1.3-3. Monitor Working Inventory**

*Node A1*

## **Node A1: Monitor Working Inventory**

**Figure 1.3-3** shows how the SelecTrac Systems monitor the working inventory.

### **Process 11: Determine System Configuration**

The number and physical location of hook registers, box registers, manual registers for SelecTrac-CL systems and medicine dispenser magazines, and electronic lock cabinets (ELCs) for SelecTrac-Rx systems must be manually entered at the Administrator's Workstation (AWS) when the system is installed.

Non-system storage may also be manually configured and maintained within the SelecTrac system. An artificial controller address and position will be created by the system.

### **Process 12: Initial Inventory Quantities/Assignments**

A list of all supplies to be controlled may be selected from a master supply list or manually entered at the AWS.

When more than one storage position is assigned the same supply, these positions may be treated as a position group for minimum quantity calculations.

The type of supply and initial quantity assigned to each register, medicine dispenser magazine, and electronic lock cabinet must be entered manually at the AWS.

### **Process 13: Validate User Authorization**

Some supplies may require controlled access because of Government Regulations (as in the handling of narcotics) or the hospital's desire to control expensive supplies. These supplies must be kept in an ELC or medicine dispenser. Access to these supplies will be granted only after a valid user ID and personal identification number (PIN) are provided to the system at a display terminal. A swipe card for automatic entry of an identified user will be provided but the PIN must be entered manually. Any supply or medicine can require a second user ID and PIN. The user should logout when done dispensing, but the system will automatically logout the user if there is no activity for 1 minute, as a security precaution.

For SelecTrac-CL, a user will logon by using a swipecard or a touch screen keypad, but a PIN will not be required. This will record the user's name with activities as long as the user has not logged out. There will not be an automatic logout.

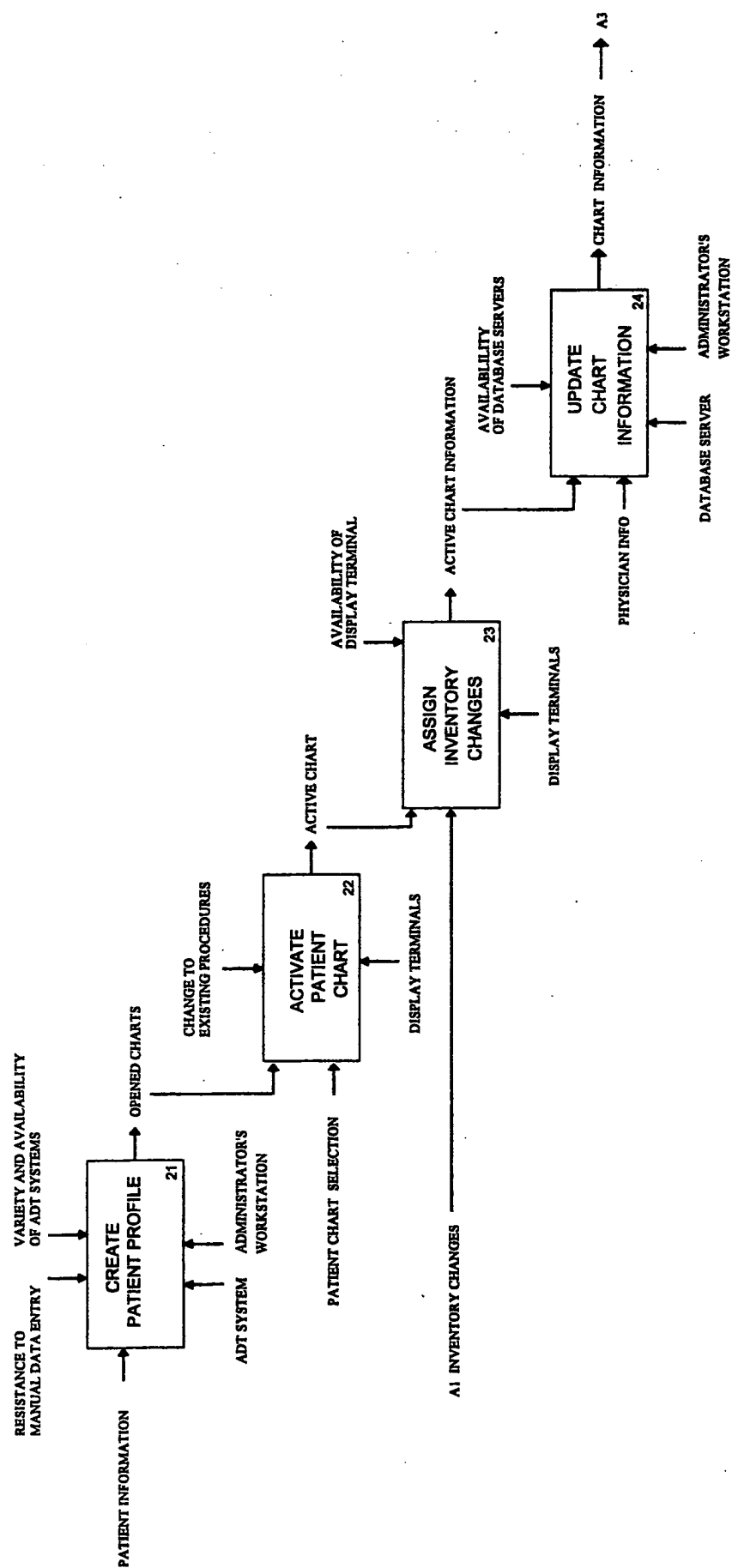
## **Process 14: Dispense Supplies**

Supplies are dispensed manually at the hook and box registers, but the system automatically senses the change in inventory. Note that the system also automatically detects returns and restocking.

Supplies are also dispensed at the manual register, but the person adding or removing the supply must indicate the change in inventory by pushing a button once for each supply.

Supplies dispensed by a Medicine Dispenser are automatically updated by the SelecTrac systems. In the event that the SelecTrac system believes a medicine was dispensed, but the medicine was not actually dispensed, the user must manually inform the system at a display terminal. The system will then inquire if the user wants the medication dispensed from another magazine, if possible. It will also indicate which magazine failed in the error log.

The SelecTrac system will unlock an ELC drawer with proper authorization, but the user must indicate the quantity of supplies taken, returned, or stocked at the display terminal.



**Figure 1.3-4. Track Inventory Utilization**

## Node A2



## **Node A2: Track Inventory Utilization**

Figure 1.3-4 shows specific inventory tracking functions of the SelecTrac systems.

### **Process 21: Create Patient Profile**

Current patient profile information will be sent periodically from the ADT system to the SelecTrac system. This data may also be manually entered at the AWS.

### **Process 22: Activate Patient Chart**

A patient's Chart may be activated by selecting it at the display terminal (by touching the patient name displayed).

### **Process 23: Assign Inventory Changes**

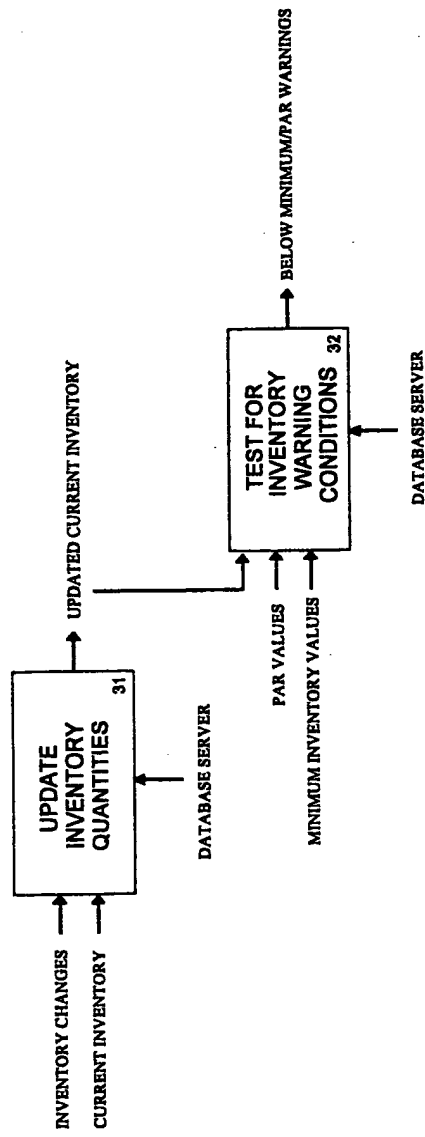
Any inventory changes automatically or manually detected are assigned to the active patient chart. If there is not an active patient chart, the inventory changes are charged to an overhead account.

**Event Status.** There are 6 types of Inventory Events:

1. **Stocked:** a supply is stocked when the system detects an increase in inventory at a supply position and there is not an active patient chart at that location or when the supply quantities are increased at the Display Terminal.
2. **Taken:** a supply is taken when the system detects a decrease in inventory at a supply location.
3. **Returned:** the opposite of taken. A supply is returned if the system detects an increase in inventory at a supply position while there is an active patient chart at that location.
4. **Expired:** a supply may be marked as expired only at the Display Terminal. It should be physically removed from its supply location.
5. **Wasted:** a supply is wasted when it has not been entirely used but cannot be returned. Typically, a wasted supply is a narcotic that is not packaged in the amount prescribed for a patient. The next larger size is dispensed and charged to the customer but the amount that is unused must be wasted according to law. The amount wasted must be indicated at a display terminal as a percentage of the entire dose by a valid user and witnessed by another valid user.
6. **Adjusted:** these are changes not described above that are made at the AWS. Changing a supply assignment from one patient chart to another would be an adjustment. Manually assigning a supply to a patient chart from the AWS would be another type of adjustment.

#### **Process 24: Update Procedure Information**

Additional information such as the attending physician or room assignment may be added to any procedure at the AWS. A chart may be marked as on-hold (completed but awaiting administrative review), or it may be closed (information is sent to the HIS) from the AWS.



**Figure 1.3-5. Update Working Inventory** **Node A3**

## **Node A3: Update Working Inventory**

**Figure 1.3-5** shows the specific update working inventory functions of the SelecTrac System.

### **Process 31: Update Inventory Quantities**

All known inventory changes will be updated (posted) to the current working inventory quantities.

### **Process 32: Test Inventory Warning Conditions**

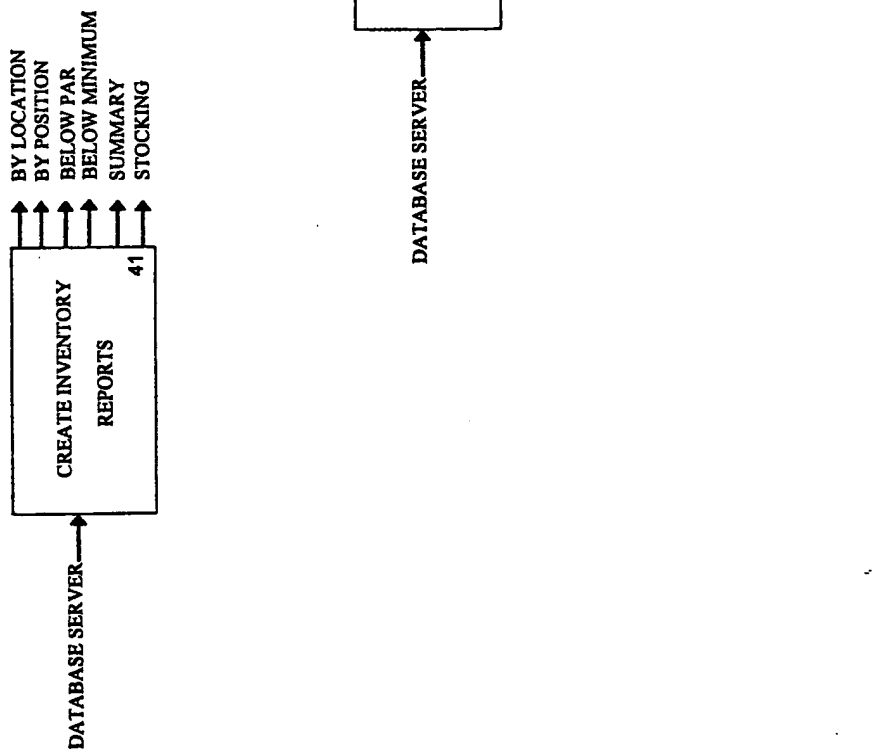
#### **Minimum Quantity Determination—For Each Inventory Change:**

If the supply position is part of a position group, then the current group quantity is compared to the group minimum quantity. If the current group quantity is less than the group minimum quantity, the restock quantity equals the group maximum quantity minus the current group quantity and a low working inventory warning is issued for the position group.

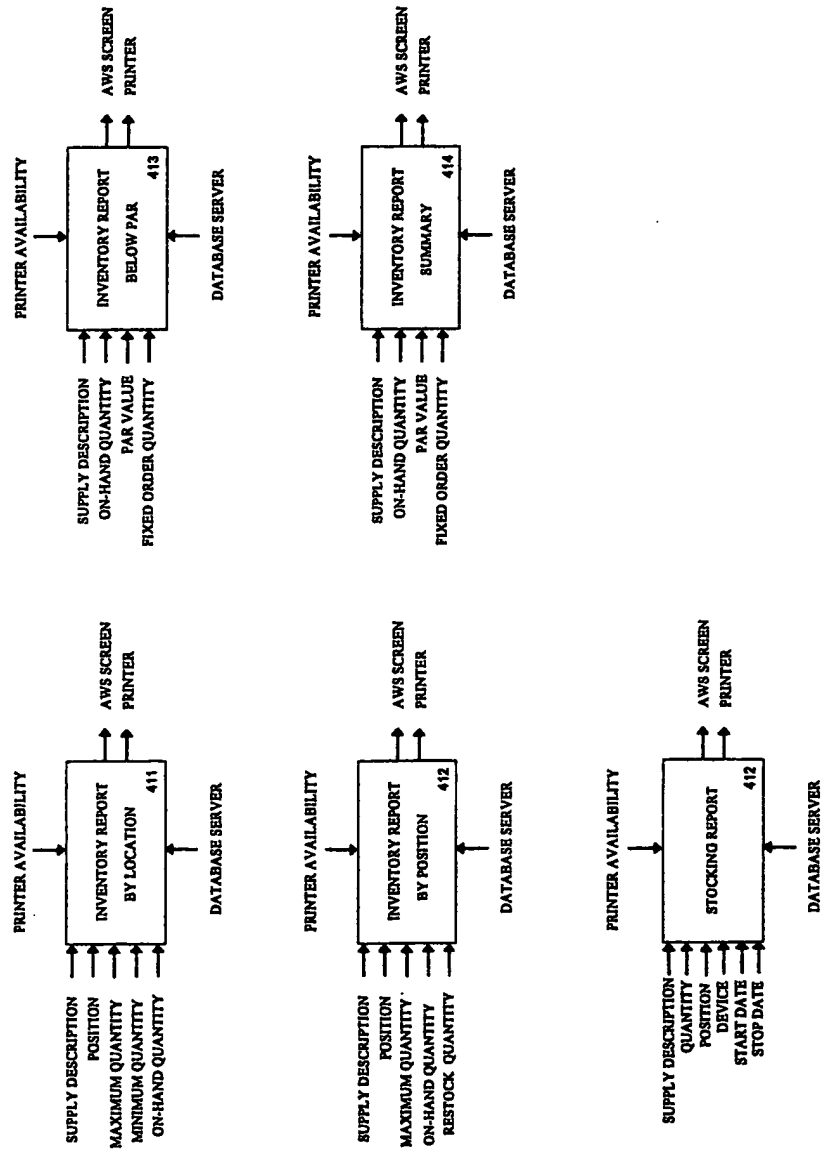
If the position is not part of a position group, then the current position quantity is compared to its minimum quantity. If the current position quantity is less than the minimum quantity for the supply position, the restock quantity equals the maximum quantity minus the current quantity, and a low working inventory warning is issued for the supply position.

#### **Below Par Determination—for Each Inventory Change:**

The supply system quantity is compared to the supply par value. If the supply system quantity is less than the supply par value, a below par warning is issued for the supply with its fixed order quantity.

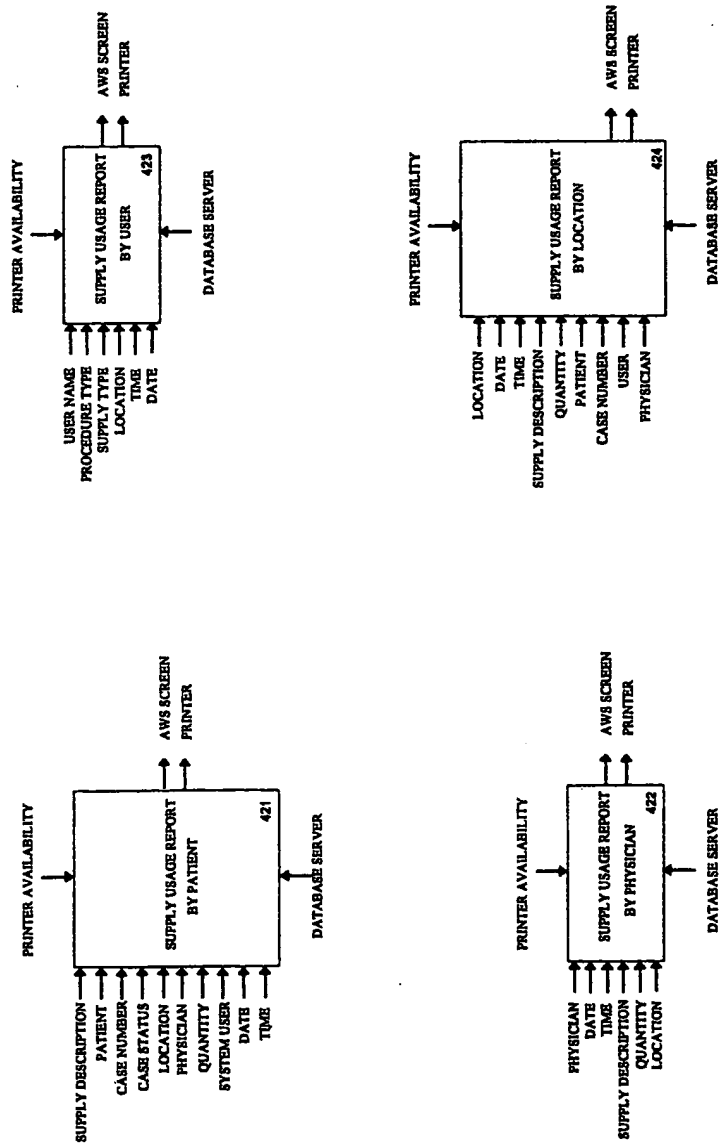


**Figure 1.3-6. Reporting Functions** **Node A4**



**Figure 1.3-7. Inventory Reports**

**Node A41**



**Figure 1.3-8. Usage Reports**

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## **Node A4: Provide Reports**

**Figure 1.3-6** shows the reporting functions of the SelecTrac systems. These reports may be printed or sent to the HIS system. The SelecTrac systems provide three categories of reports:

### **Process 41: Inventory Reports**

1. **Inventory Report by Location** documents the supply description, the system position, the minimum quantity at that position, the maximum quantity at that position, and the on-hand quantity.
2. **Inventory Summary Report** documents the supply description, the on-hand quantity, the par value of the supply, and the fixed order quantity.
3. **Below Minimum Report** documents the supply description, the system position, the maximum quantity at that position, the on-hand quantity, and the restock quantity.
4. **Below Par Report** documents the supply description, the on-hand quantity, the par value, and the fixed order quantity of all supplies that are at or below par.
5. **Stocking Report** documents, by location, the supplies and quantities stocked over a specified period of time.

### **Process 42: Usage Reports**

1. **Patient Usage Reports** document the patient name, procedure number, procedure status, event location, procedure physician, the date and time of the event, the supply description, the quantity used, and the system user who took the supply.
2. **Physician Usage Reports** document the physician name, event date and time, the supply description, the quantity used, and the event location. Physician Usage may be reported on a per procedure type basis or on a diagnostic related group (DRG) basis.
3. **User Usage Reports** document the user name, a procedure description, the supply description, the quantity used, and the event location.

### **Process 43: Maintenance Reports**

The Maintenance Report documents all system component failures, including time and date of failure, time and date returned to operation, service person, and reason for failure, if known.

## 1.4 Dynamic Models

---

Patient information may be received from the hospital's admission discharge transfer (ADT) system, the hospital's pharmacy system, or be manually entered at the AWS. When patient information is received, the SelecTrac system looks to see if the patient is known to the system. If the patient doesn't already exist in the database, a new patient profile is created.

If this is not an existing patient, a new chart is created for this patient visit.

If there is an open chart for this patient, the information is updated.

If there is not an open chart for this visit, then a new chart is opened.

A medication order may be received from the pharmacy by the Hospital Information System or it may be created manually at the AWS. A medication order must contain the medicine required and the dose and will usually contain the route, site, drug strength, solution rate, start date, start time, end date, end time, frequency, drug ID, order number, order comments, and ordering physician.

If a medication order is received for a patient that is not already entered into the SelecTrac system, the patient profile and a chart for this visit will be automatically created. Once a patient chart exists and is open, it is available to be selected at a display terminal.

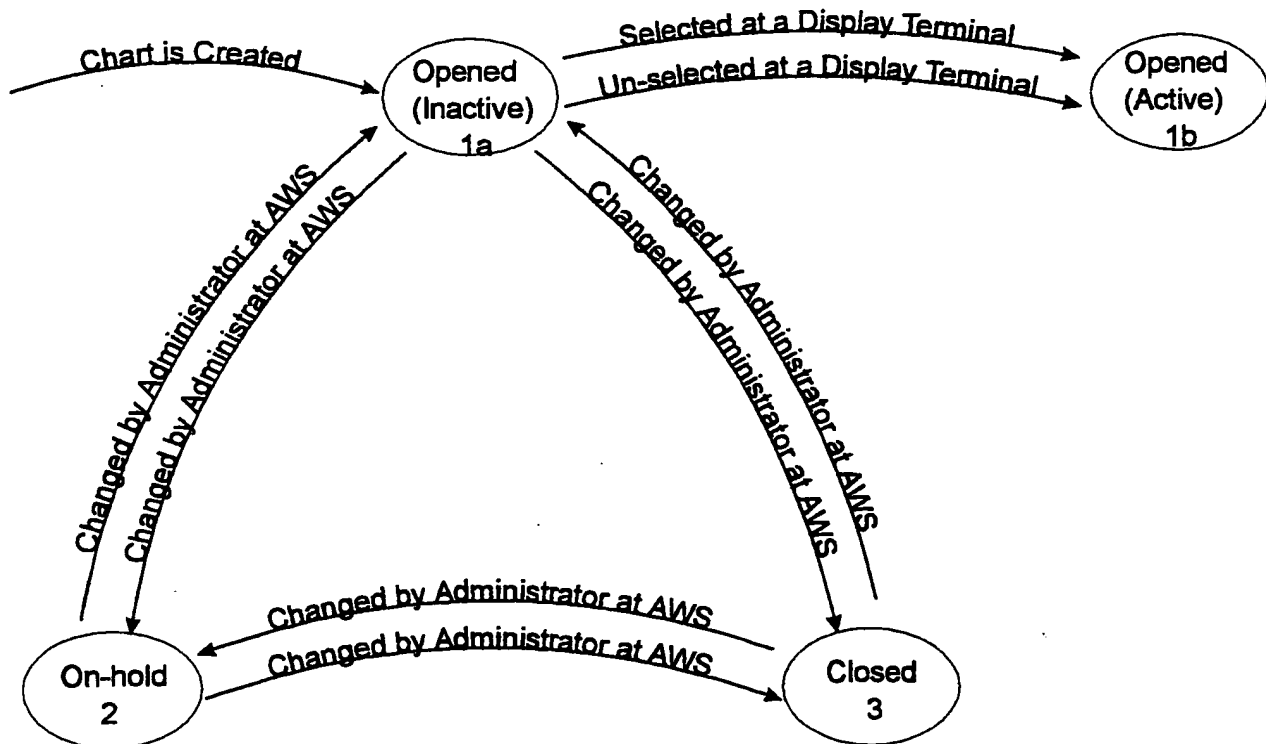


Figure 1.4-1. Patient Chart State Diagram

A Patient's chart may exist in one, and only one at a time, of three states:

1. **Opened:** a patient's chart is in the Opened state when it is created and remains in the Opened state until the Administrator changes its state to either On-Hold or Closed.  
Note that only Opened patient charts can be selected at a display terminal.  
Opened patient charts may exist in one, and only one, of two substates:
  - 1a. **Inactive**—the patient chart is not currently selected at a display terminal. A newly Opened patient chart is Opened in the Inactive substate.
  - 1b. **Active**—the patient chart is currently selected at a display terminal.
2. **On-Hold:** a patient chart is put On-Hold by the Administrator to prevent it from being selected at a display terminal. It will remain in the On-Hold state until the Administrator either changes it back to the Opened state or changes it to the Closed state.
3. **Closed:** a patient chart is Closed by the Administrator. Normally a patient chart is not closed until the patient has been discharged and all relevant information has been entered in the database, such as physician name and location. When a patient chart is Closed, a Patient/Procedure Report is generated for the Closed patient chart and relevant information is sent to the Hospital Information System (HIS). A Closed patient chart may be re-Opened by the Administrator. A patient chart that has been closed for a period greater than the Procedure Archive Period will be archived to tape and removed from the database. It can be retrieved from tape at any time.

## 1.5 Database Models

This chapter explains the logical data model and physical database for the SelecTrac systems.

### LOGICAL DATA MODEL

The logical data model is an IDEF1x model. IDEF1x is a standard modeling technique for specifying data structures and business roles. The basic components of an IDEF1X model are entities, attributes and relationships:

1. **An entity** is any distinguishable person, place, thing, event or concept. It can be thought of as a noun. An instance is a single occurrence of an entity and is not shown in the data model.
2. **An attribute** is a property of an entity. It can be thought of as an adjective of the entity.
3. **A relationship** represents connections or associations between entities. They are the business rules that the model supports. They can be thought of as the verbs in the model.

There may be parent entities and child entities. No instance of a child entity may exist without an associated instance of a parent entity. A rectangular box represents a parent entity. A rounded box represents a child entity. The relationship (business rule) that links them is indicated by a line drawn between them.

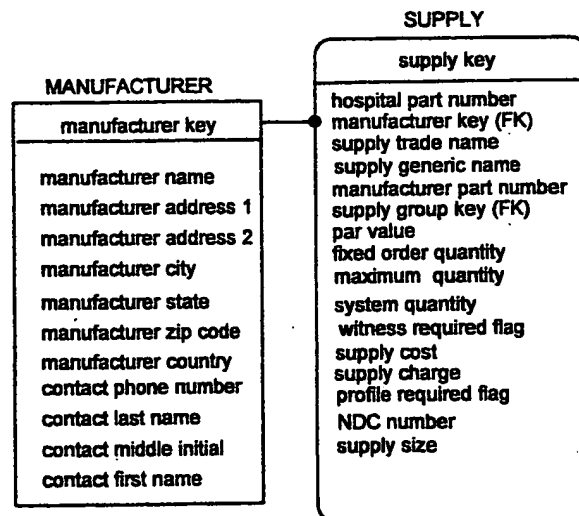


Figure 1.5-1. IDEF1X Model

In Figure 1.5-1, the manufacturer is a parent of the supply entity. This implements the business rule that there must be a manufacturer before a supply can be created. The dot on the supply end of the connecting line denotes "many"; that is, a single manufacturer may make many supplies. The absence of a dot on the manufacturer side of the connecting line indicates that a supply may be assigned to exactly one manufacturer. An instance of manufacturer could be:

MANUFACTURER NAME	MedSelect Systems, Inc.
MANUFACTURER ADDRESS 1	501 Thomson Park Drive
MANUFACTURER ADDRESS 2	
MANUFACTURER CITY	Mars
MANUFACTURER STATE	PA
MANUFACTURER ZIP CODE	16046
MANUFACTURER COUNTRY	USA
CONTACT PHONE NUMBER	412-555-5555
CONTACT LAST NAME	Smith
CONTACT MIDDLE INITIAL	Q.
CONTACT FIRST NAME	John

This specification has intentionally strayed from the IDEF1x standard in the following ways:

- Some physical database entities are shown in the logical model to allow the logical model to more completely relate to the functions defined later in the specification, for example the Hospital Setup entity is a physical model entity.
- Status attributes are expanded to show all possible values. This enables a reader of the model to understand the various states the table records may exist in.
- Some physical database attributes are shown. The convention followed is to prefix the attribute with an "AWS\_" to indicate that this attribute was added to simplify processing at the Administrator Workstation, and with a "DT\_" to indicate that this attribute was added to simplify processing at the Display Terminal.
- Solid lines should only connect identifying relationships (the child entity inherits the parent key as part of its primary key) and dashed lines indicate non-identifying relationships. Our model uses only solid lines for reading clarity.

Figure 1.5-2 shows the SelecTrac systems logical data model.

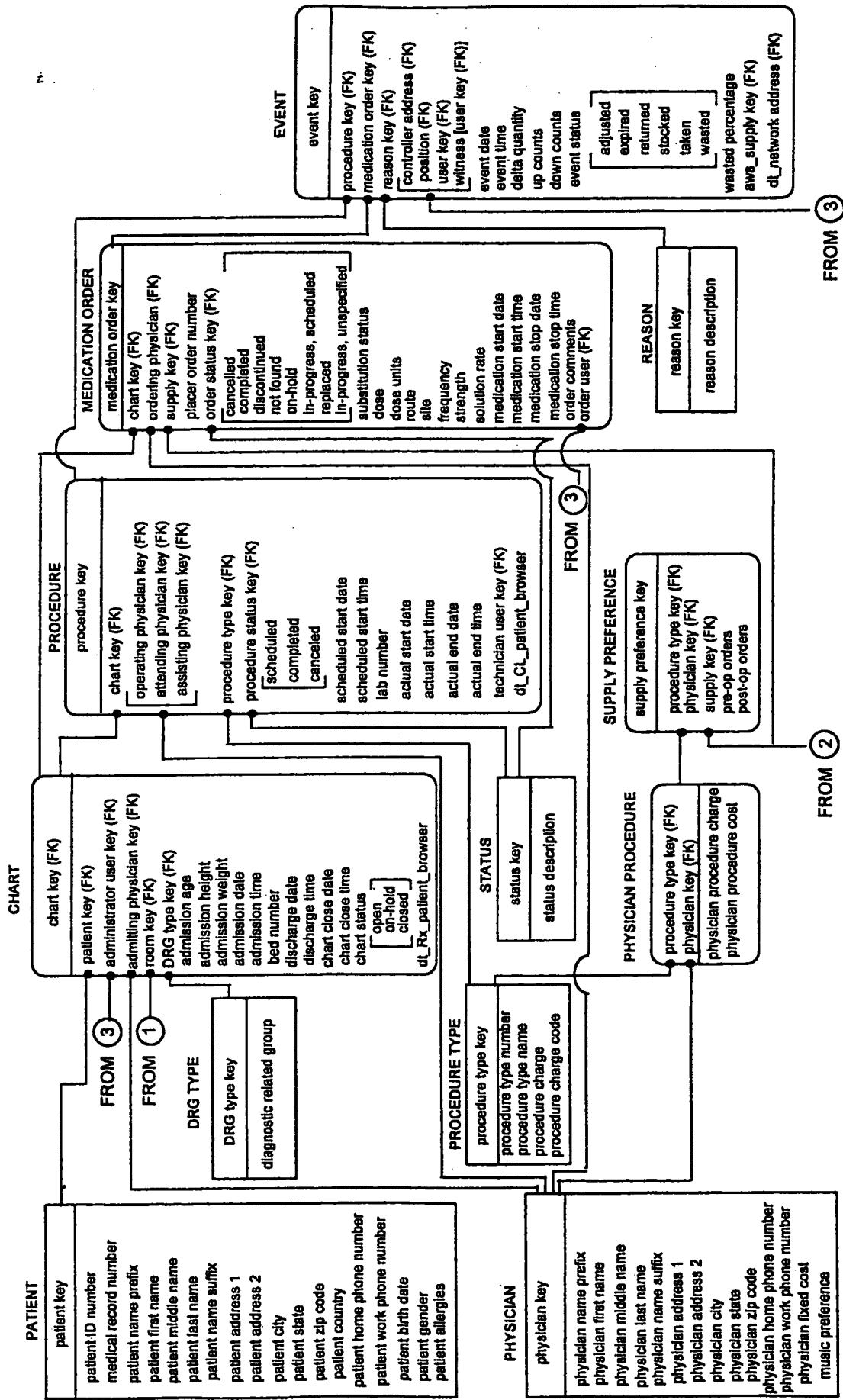


Figure 1.5-2a. Logical Data Model

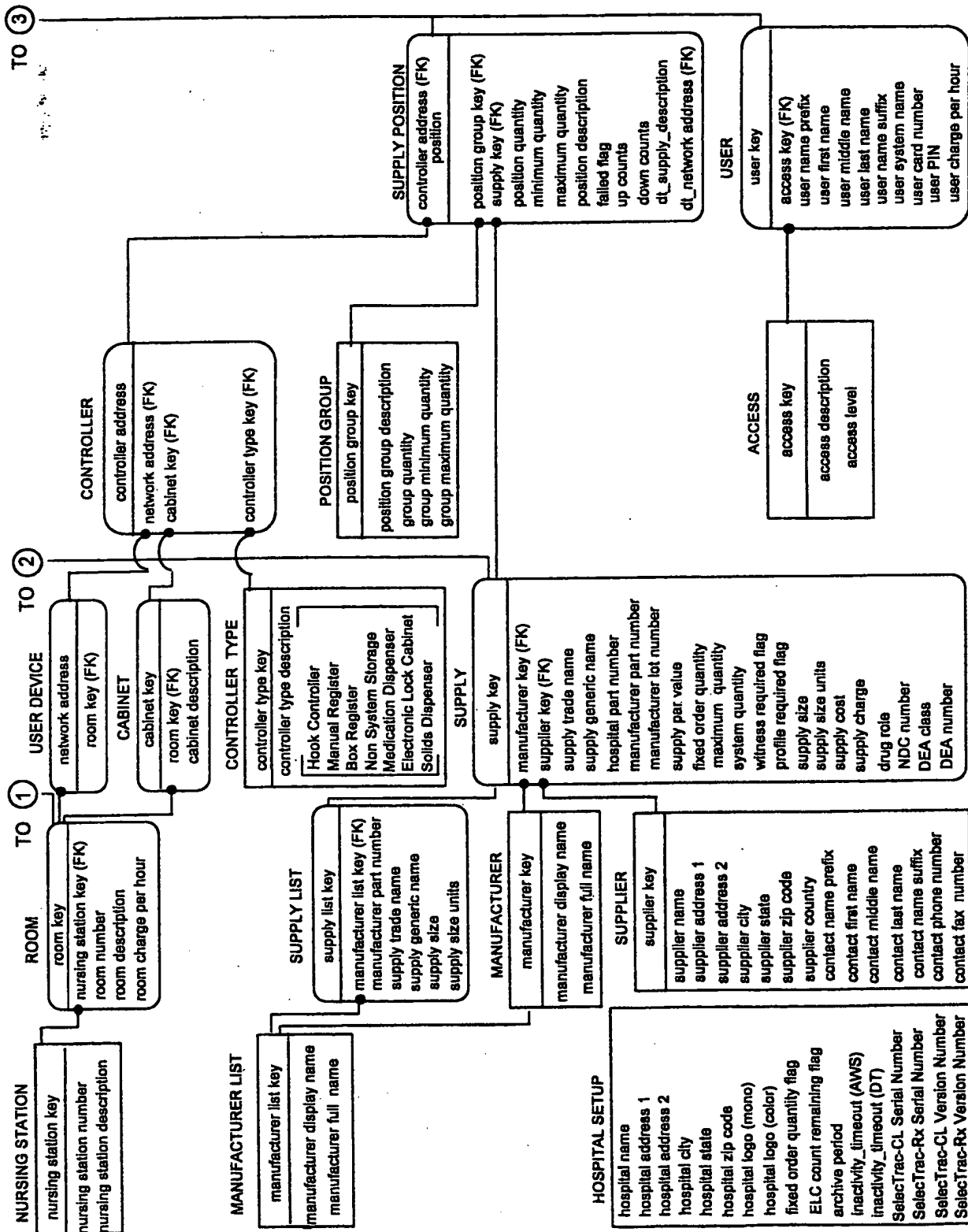


Figure 1.5-2b. Logical Data Model

**Entity****Entity Definition****Access**

Determines which functions different SelecTrac system users can employ.

**Chart**

A record of a Patient's treatment during a hospital stay.

**Controller**

An intelligent storage control communications device such as a hook register controller, box register controller, manual register controller, electronic lock drawer controller, or medicine dispenser controller.

**Controller Type**

A list of MedSelect Inventory Control devices.

**DRG Type**

Diagnostically Related Groups of diagnoses.

**Event**

An increase or decrease of a single unit of a supply at a supply position or a change in the status of a supply (for example, the supply expired or was wasted).

**Hospital Setup**

A list of options that a customer can choose to customize some software features of the SelecTrac systems.

**Manufacturer**

A company that produces or fabricates a supply.

**Manufacturer List**

A list of widely known manufacturers that the customer can choose from to aid in populating the customer's manufacturer database.

**Medication Order**

Instructions from a physician to treat a disease with drugs. The medication order is generally created by a pharmacist based on the physicians instructions.

**Nursing Station**

A hospital location where nurses are assigned to provide medical care to patients that are in hospital rooms that this location is responsible for, i.e. Nursing Station 4W.

**Patient**

One who is being treated for an illness or injury. Any individual receiving medical care.

**Physician**

A person who has successfully completed the prescribed course of studies in a medical school officially recognized by the country in which it is located, and who has acquired the requisite qualifications of licensure in the practice of medicine. An attending physician is a physician on the staff of a hospital who regularly cares for patients there.



Physician Procedure	A cross-reference of each physician by each procedure type.
Position Group	Storage locations containing the same supply that are considered together in minimum inventory calculations.
Procedure	An occurrence of treatment for an illness or injury.
Procedure Type	A list of common medical procedures
Reason	A customer defined list of reasons that describe the circumstances which a supply would be deemed unusable.
Room	A place where patients reside during there hospital stay.
Supplier	A company that sells supplies to hospitals.
Supply	A material or provision stored and dispensed as required. Relevant examples are a 7f Catheter and 500 mg Tylenol caplets.
Supply List	A list of widely used supplies that the customer can choose from to aid in populating the customer's supply database.
Supply Position	A hook register, box register, manual register, dispenser magazine, lock drawer or other storage that may contain a supply.
Supply Preference	A list of the preferred supplies used by a physician to perform a specific procedure type.
User	Any person authorized to use the SelecTrac system.
User Device	A computer such as a display terminal or administrator's workstation.

<b><u>Attribute</u></b>	<b><u>Attribute Definition</u></b>
Access Description	A series of hospital defined restrictions on the types of functions that a <i>user</i> is allowed to perform within the SelecTrac System.
Access Level	A SelecTrac defined list of access restrictions.
Actual Start Date	The date that a procedure actually begins.
Actual Start Time	The time that a procedure actually begins.
Actual Stop Date	The date that a procedure is actually completed.
Actual Stop Time	The time that a procedure is actually completed.
Admission Age	The patient's age at the time of admission.
Admission Date	The date the <i>patient</i> was admitted to the hospital.
Admission Height	The patient's height at the time of admission.
Admission Time	The time of day that the patient was admitted to the hospital.
Admission Weight	The patient's weight at the time of admission.
Archive Period (Months)	The number of months after a Chart has been closed before it is archived to tape and removed from the server.
Bed Number	A numeric value that distinguishes each bed in a room.
Chart Close Date	The date that a <i>chart</i> is closed.
Chart Close Time	The time of day that a <i>chart</i> is closed.
Chart Status	The current status of a <i>chart</i> at a point in time. Valid <i>chart</i> status values are "open", "on-hold", and "closed".
Controller Address	Each controller is assigned a unique number for identification by the SelecTrac system.
Controller Type Description	Identifies to the system a specific storage device type such as Hook Register, Medicine Dispenser or Box Register.
DEA Class	A Drug Enforcement Agency defined class of drug.

DEA Number	A unique number assigned by the Drug Enforcement Agency for prescribing controlled substances, which must be recorded on prescriptions.
Delta Quantity	The change in the number of a supply at a supply position within a single <i>event</i> . The delta quantity may be greater than 1 when a number of supplies are rapidly added or removed from the system.
Diagnostic Related Group (DRG)	A combining of different diagnoses into a group for statistical analysis.
Discharge Date	The date that a patient is discharged from the hospital.
Discharge Time	The time of day that a patient is discharged from the hospital.
Dose	Amount of a medicinal preparation to be administered at one time.
Dose Units	The measurement used with a dose size, i.e. mg, mL, etc.
Down Counts	A system specific counter of supplies that are taken from a storage device that is used to verify that the system is counting accurately.
Drug Role	The purpose for which the drug will be administered.
ELC Count Remaining Flag	A customer option that indicates that after an ELC drawer has been opened, the remaining supplies must be counted and entered into the system by the user that opened the drawer.
Event Date	The date that an <i>event</i> occurs.
Event Status	Indicates the kind of <i>event</i> . Valid event status values are: adjusted (by an administrator), expired, returned, stocked, taken, and wasted.
Event Time	The time of day that an <i>event</i> occurs.
Failed Flag	Indicates that a <i>supply position</i> is no longer able to recognize when a supply is added or removed, or for a dispenser when a magazine did not dispense a medication properly.
Fixed Order Quantity	The standard quantity of a <i>supply</i> that is requested at the time of reordering. This set quantity is not necessarily dependent upon <i>maximum</i> , <i>minimum</i> , or <i>par</i> quantities for the <i>supply</i> .

Fixed Order Quantity Flag	A customer option that indicates that a fixed order quantity rather than a calculated order quantity should be used when a supply goes below par.
Frequency	The number of times to administer a medication within a certain period of time.
Group Maximum Quantity	The largest number of a <i>supply</i> a hospital wants to have at a particular set of storage positions.
Group Minimum Quantity	The smallest number of a <i>supply</i> a hospital wants to have at a particular set of storage positions.
Group Quantity	The current number of <i>supplies</i> in storage positions that are grouped together for minimum quantity calculations.
Hospital Address1	The first line of a <i>hospital's</i> address.
Hospital Address2	The second line of a <i>hospital's</i> address.
Hospital City	The <i>hospital's</i> city.
Hospital Logo (Color)	A 1 inch by 1 inch bitmap of the hospital's logo in color for use on the AWS menus.
Hospital Logo (Mono)	A 1 inch by 1 inch bitmap of the hospital's logo in monochrome for use on the reports. Note that a color logo can be used in this field and will still print in monochrome on reports.
Hospital Name	The name of the medical facility.
Hospital Part Number	The number assigned by the hospital to uniquely identify a <i>supply</i> . For medications, this is the hospital formulary number.
Hospital State	The <i>hospital's</i> state or province.
Hospital Zip Code	The post office zip code for the <i>Hospital</i> .
Inactivity Timeout (AWS)	The number of seconds without activity on an administrator workstation before the user is automatically logged out.
Inactivity Timeout (DT)	The number of seconds without activity on a SelecTrac-Rx display terminal before the user is automatically logged out.

Lab Number	A simple number (1 thru 999) assigned to an operating room for scheduling purposes.
Manufacturer Display Name	A short manufacturer name for screen displays.
Manufacturer Full Name	The name of a company that manufactures medical supplies.
Manufacturer Lot Number	A number assigned by a <i>manufacturer</i> to a batch of <i>supplies</i> .
Manufacturer Part Number	The number assigned by a manufacturer to identify a <i>supply</i> .
Maximum Quantity	The maximum amount of a <i>supply</i> that a hospital wants to keep in a particular <i>supply position</i> . The amount reordered is the difference between maximum quantity and the position quantity.
Medical Record Number	A hospital assigned number associated with a patient's hospital records.
Medication Start Date	The date that a medication order begins.
Medication Start Time	The time that a medication order begins.
Medication Stop Date	The date that a medication order ends.
Medication Stop Time	The time that a medication order ends.
Minimum Quantity	The minimum amount of a supply that a hospital wants to keep in a particular <i>supply position</i> .
Music Preference	The type of music an operating physician prefers while performing a specific procedure type.
NDC Number	National Drug Code (NDC) is a pharmacy defined code for specifying medications.
Network Address	A unique number that identifies each PC on the ethernet network. This number is used to load a specific configuration for a <i>display terminal</i> .
Nursing Station Description	Text that describes a Nursing Station.
Nursing Station Number	A number that the hospital assigns to a nursing station, i.e. 4W.
Order Comments	Comments supplied by the pharmacist about a medication order.
Order Status	A medication order may be active, on-hold, or discontinued.

Patient Address 1	The first line of a <i>patient's</i> address.
Patient Address 2	The second line of a <i>patient's</i> address.
Patient Allergies	A list of known patient allergies to drugs.
Patient Birth Date	The date the <i>patient</i> was born.
Patient City	The city where the <i>patient</i> resides.
Patient Country	The country where the <i>patient</i> resides.
Patient First Name	A <i>patient's</i> first name or initial.
Patient Gender	Male or Female.
Patient Home Phone Number	A <i>patient's</i> full home telephone number.
Patient ID Number	A number assigned by the hospital to uniquely identify a <i>patient</i> .
Patient Last Name	A <i>patient's</i> surname.
Patient Middle Name	The <i>patient's</i> middle name or initial.
Patient Name Prefix	Titles, such as Dr., Mr., Ms., etc.
Patient Name Suffix	Descriptors that would normally follow a name, such as Jr., III, Md., Phd., etc.
Patient State	The state where the <i>patient</i> resides.
Patient Work Phone Number	A <i>patient's</i> full work telephone number, including extension.
Patient Zip Code	The post office zip code for the <i>patient's</i> residence.
Physician Address 1	The first line of a <i>physician's</i> address.
Physician Address 2	The second line of a <i>physician's</i> address.
Physician City	The city where the <i>physician</i> resides.
Physician First Name	The first name or initial of a <i>physician</i> at the hospital.
Physician Fixed Cost	A contract cost for a physician.

Physician Home Phone Number	A <i>physician's</i> full telephone number.
Physician Last Name	A <i>physician's</i> surname.
Physician Middle Name	A <i>physician's</i> middle name or initial.
Physician Name Prefix	Titles, such as Dr., Mr., Ms., etc.
Physician Name Suffix	Descriptors that would normally follow a name, such as Jr., III, Md., Phd., etc.
Physician Procedure Charge	The physician charge to a patient for a procedure.
Physician Procedure Cost	The cost of a physician to perform a specific procedure.
Physician State	The state where the <i>physician</i> resides.
Physician Work Phone Number	A <i>physician's</i> full work telephone number, beeper or pager number, extension, etc.
Physician Zip Code	The post office zip code for the <i>physician's</i> residence.
Placer Order Number	A hospital system assigned number for a medication order.
Position Description	Text that describes the <i>supply position</i> to the user.
Position Group Description	Text that lists the <i>supply positions</i> that belong to the group.
Position Quantity	The current amount of a <i>supply</i> at a particular <i>supply position</i> .
Post-Op Orders	A physician defined list of orders for patients to follow after a procedure, on a procedure type basis.
Pre-Op Orders	A physician defined list of orders for patients to follow prior to a procedure, on a procedure type basis.
Procedure Charge	The hospital charge for a procedure.
Procedure Charge Code	A billing code, generally insurance specific (i.e. Blue Cross billing code).
Procedure Status	A procedure may be scheduled, completed or canceled.
Procedure Type Name	A description of a procedure, i.e. Left Heart Catheterization.

Procedure Type Number	A numerical value that the hospital may assign to a procedure type.
Profile Required Flag	A customer option that indicates that a medication must be in the Patient's profile before it can be dispensed.
Reason Description	A hospital defined list of reasons for wasting or returning a supply, usually a medication.
Room Charge Per Hour	The amount the hospital wants to charge for the patient's room.
Room Description	Text that helps define a room to the hospital staff.
Room Number	The number assigned to a patient room.
Route	The way that a drug is introduced into the body. The route is chosen according to the speed of absorption desired and the site of action of the medication.
Scheduled Start Date	The day that activity for a <i>procedure</i> is planned to begin.
Scheduled Start Time	The time of day that activity for a <i>procedure</i> is planned to begin.
SelecTrac-CL Serial Number	A software license number that uniquely identifies a customer's right to use a SelecTrac-CL system.
SelecTrac-Rx Serial Number	A software license number that uniquely identifies a customer's right to use a SelecTrac-Rx system.
SelecTrac-CL Version Number	A number that uniquely identifies a release of the SelecTrac-CL software, i.e. V1.2.
SelecTrac-Rx Version Number	A number that uniquely identifies a release of the SelecTrac-Rx software, i.e. V2.3.
Site	Position on a patient for administering a drug.
Solution Rate	The rate at which a supply will dissolve in a liquid.
Strength	The concentration of a solution or substance.
Substitution Status	The substitution status for a prescribed drug where: Y means generic substitution is allowed. N means it must be prescribed exactly as written.



Supplier Address1	The first line of a <i>supplier's</i> address.
Supplier Address2	The second line of a <i>supplier's</i> address.
Supplier Contact First Name	The first name or initial of the person to contact for a <i>supplier</i> .
Supplier Contact Last Name	The surname of the person to contact for a <i>supplier</i> .
Supplier Contact Middle Name	The middle name or initial of the contact person for a <i>supplier</i> .
Supplier Contact Phone Number	A full telephone number for a <i>supplier</i> contact.
Supplier City	The city where the <i>supplier</i> operates.
Supplier Country	The country where the <i>supplier</i> operates.
Supplier Fax Number	A full telephone number for a <i>supplier's</i> fax machine.
Supplier Name	The name of a company that sells medical supplies.
Supplier Name Prefix	Titles, such as Dr., Mr., Ms., etc.
Supplier Name Suffix	Descriptors that would normally follow a name, such as Jr., III, Md., Phd., etc.
Supplier State	The state where the <i>supplier</i> operates.
Supplier Zip Code	The post office zip code for the <i>supplier's</i> operation.
Supply Charge	The amount the hospital wants to charge for a supply.
Supply Cost	The latest cost of a particular <i>supply</i> .
Supply Generic Name	The non-trademark name for a supply or the chemical name for a medicine.
Supply Par Value	The minimum quantity of a <i>supply</i> that a hospital wants to keep in inventory. The <i>supply</i> will be re-ordered when par is reached.
Supply Size	The per unit amount of a supply, i.e. 400 units.
Supply Size Units	The measurement used with a supply size, i.e. mg, mL, etc.
Supply Trade Name	The proprietary name protected by U.S. Trademark for a supply.

System Quantity	The total number of units of a <i>supply</i> across the entire SelecTrac system.
Up Counts	A system specific counter of supplies that are added to a storage device that is used to verify that the system is counting accurately.
User Card Number	The number required to logon to a display terminal. The number may be encoded on a magnetic or bar coded card.
User Charge Per Hour	The rate charged to a patient for Nurses, technicians, etc. that are assisting during a procedure.
User First Name	The first name or initial of an authorized <i>user</i> of a SelecTrac system.
User Last Name	The surname of an authorized <i>user</i> of a SelecTrac system.
User Middle Name	The middle name or initial of an authorized <i>user</i> of a SelecTrac system.
User Name Prefix	Titles, such as Dr., Mr., Ms., etc.
User Name Suffix	Descriptors that would normally follow a name, such as Jr., III, Md., Phd., etc.
User PIN (Personal Identification Number)	A numeric value known only to the authorized SelecTrac system <i>user</i> , that when entered with the user's system name will allow access at the user's authorized access level.
User System Name	A name that defines a <i>user</i> uniquely to the SelecTrac system..
Wasted Percentage	The amount of a supply, usually a medication, that can't be administered or returned, specified as a percentage of the total amount of the supply.
Witness	The <i>user</i> witnessing the <i>event</i> of a medication being wasted.
Witness Required Flag	A customer option that indicates that a second user must login to witness the dispensing or return or wasting of a supply, usually a controlled medication.

## **Business Definition (Entity Relationships)**

### **PATIENT**

- A *patient* will have a first and last name.
- A *patient* will have a *chart* for every hospital stay.
- A *patient* may have zero, one, or many *procedures* scheduled (SelecTrac-CL).
- A *patient* may have zero, one or many *medications* ordered (SelecTrac-Rx).
- A *patient* may be assigned a patient ID number and a medical record number.
- A *patient* may be assigned to a *room* (SelecTrac-CL).
- A *patient* will be assigned to a *room* (SelecTrac-Rx).
- A *patient's* address, telephone number, gender, and birth date may be recorded.

### **CHART**

- A *chart* will exist for each *patient* for each hospital stay.
- A *chart* can be in one and only one of three states:
  1. Open—charges may be assigned to this *chart*.
  2. On-Hold—activity is completed but information must be reviewed.
  3. Closed —*patient* and *chart* information are sent to the HIS.
- An Open *chart* will be active if it is currently selected at a Display Terminal, otherwise it will be inactive.
- A *chart* will be opened, placed on hold, and closed by an administrator user, at the Administrator's Workstation. The close date, close time, and administrator user name is recorded when a *chart* is closed.
- A *patient's* age, height, weight, admission date, admission time, discharge date, discharge time, referral physician room number and bed number may be recorded.

### **PROCEDURE**

- A *procedure* may be scheduled to be treated in a single *room* on a specific date and time.
- A *procedure* may have an operating *physician*, attending *physician*, and assisting *physician* assigned to it.
- A *procedure's* scheduled start date, scheduled start time, actual start date, actual start time, end date, and end time may be recorded.
- A fixed procedure charge and a charge code may be assigned to a *procedure*.

### **PROCEDURE TYPE**

- Each procedure may have a procedure type name and a procedure type number.

### PHYSICIAN

- An operating *physician* will be assigned to each *procedure* and may be assigned to many *procedures*.
- Attending and assisting *physicians* may be recorded for *procedures*.
- The referral *physician* may be recorded in the *patient's* file.
- Each physician's music preference may be recorded.

### PHYSICIAN PROCEDURE

- There may be a service charge and a cost assigned to each physician on a per *procedure* basis.
- A list of supply preferences may be specified for each physician for every procedure type.

### NURSING STATION

- A *nursing station* may be responsible for many *rooms*.

### ROOM

- A *room* may be scheduled for many *procedures*.
- A *room* may have a room number and bed number.
- A *room* may have an hourly charge for its use.
- A *room* may have more than one *patients* assigned to it, one per bed.

### MEDICATION ORDER

- A *medication order* may be received from the pharmacy by the Hospital Information System or it may be created manually at the AWS.
- A *medication order* must contain the medicine (supply) required, the dose, and the dose units (i.e. mg, mL).
- A *medication order* may contain the route, site, drug strength, solution rate, start date, start time, end date, end time, frequency, drug role, NDC Number, DEA Class, DEA Number, order number, order comments, and ordering *physician*.

### MANUFACTURER

- A *manufacturer* may make many different *supplies*.
- The *manufacturer's* name and a short (15 character) display name are required.
- A *manufacturer* may be selected from a master manufacturer list.

## SUPPLIER

A supplier may sell many *supplies*.

A supplier may sell supplies from many *manufacturers*.

## SUPPLY

- A *supply* must be made by only one *manufacturer*.
- Many *supplies* may be purchased from a single *manufacturer*.
- A *supply* may be selected from a master supply list.
- A description of the *supply* must be recorded.
- Each *supply* may have a manufacturer number, a hospital part number and a National Drug Code (NDC).
- A *supply* may be selected from a *master supply list*.
- The cost of a *supply* and the charge for the *supply* may be recorded.
- A 2nd User PIN from a witness may be required to dispense some *supplies*.
- *Supplies* that are medicines may require a medication order before they can be dispensed.
- A witness may be required to mark some percentage of a *supply* as wasted.
- A par value for each supply may be recorded as the minimum quantity of a supply required to be available system-wide.
- A maximum quantity for each supply may be recorded to be used for supply order calculations or a fixed order quantity may be recorded.
- The system-wide quantity available for each supply will be maintained by the SelecTrac system.

## CABINET

A cabinet may have one or more *controllers* in it.

A Vial dispenser or ELC can be considered a cabinet in that it contains 5 controllers.

## CONTROLLER

- A *controller* must have at least one *supply position* and may have many *supply positions*.
- A *controller* is a specific type of SelecTrac inventory device. The *controller* type is selected from a device type table.

## SUPPLY POSITION

- A *supply position* describes exactly one storage point (hook, box register slot, dispenser magazine, electronic lock drawer, manual register bin, etc.)
- A *supply position* may contain exactly one *supply* type. It may contain many *supplies* of the same *supply* type.
- A description of the *supply position* will automatically be recorded by the installation program.
- The position quantity will be maintained by the SelecTrac system.
- The hospital may define a minimum quantity and a maximum quantity for each *supply position*.
- When a *supply position* falls below the minimum quantity for that position, it will be reported and a restock quantity will be calculated.
- If a *supply position* fails, it will be marked as failed (this could be determined automatically by a hook register controller or manually entered at the AWS).

## POSITION GROUP

- More than one *supply position* may be grouped together for inventory calculations if they contain the same *supply*.
- A *position group* must have a position group description.
- The *position group* quantity will be maintained by the SelecTrac system.
- The hospital may define a minimum quantity and a maximum quantity for each *position group*.
- When a *position group* falls below the minimum quantity for that *position group*, it will be reported and a restock quantity will be calculated.

## EVENT

- An *event* occurs when a *supply* is added or taken from a *supply position*, a *supply* is marked as wasted or expired, or the administrator makes an inventory change at the Administrator's Workstation.
- A *supply event* must be assigned to exactly one *chart*.
- *Events* for dispensers and electronic lock cabinets require user authorization. These events may also required a witness authorization.
- If a *supply* is added, then:
  - If a *chart* is active, the *supply* is marked as returned against the active *chart*.
  - If no *chart* is active, the *supply* is marked as stocked.
- If a *supply* is removed, then:
  - If a *chart* is active, the *supply* is marked as taken against the active *chart*.
  - If no *chart* is active, the *supply* is marked as taken against the Overhead *chart*.
- If a *supply* is dispensed, then the supply is marked as taken against the active *chart*.
- A *supply* may be marked as wasted if it was not used in its entirety. The wasted percentage of the total *supply* amount must be recorded. A witness may be required. A reason for wasting the supply must be recorded from a list of standard reasons.
- A dispensed *supply* may be returned if it has not been used.
- A *supply* may be marked as expired. It will be charged against overhead *chart* and removed from inventory.
- An up count and down count strategy is used for accurate *event* reporting.

## USER

- Each *user*'s name must be recorded.
- Each *user* must have one unique user ID number, and one personal identification number (PIN) to access the SelecTrac system.
- Each *user* will have an access level which may limit functions that can be performed.

## ACCESS

- The hospital will define levels of *access* to limit the functions different users may perform with the system.
- Many users may have the same *access* level.
- Each user will have exactly one *access* level.
- Each *access* level will have a description.

## USER DEVICE

- Each *user device* (display terminal or administrator's workstation) will have exactly one unique network address.
- Each *user device* will have *controllers* for *supply devices* wired to it for both power and communications and is responsible for only these devices.

## **PHYSICAL DATA MODEL**

### **ACCESS.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOURC
Access Key	Numeri	1	Yes	Yes		
Access Description	Alpha	30		Yes		
Access Level	Short	1		Yes		

### **CABINET.DB**

#### **Cabinet**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Cabinet Key	Numeri	1	Yes	Yes		
Room Key	Numeri	1	FK			
Cabinet Description	Alpha	30				

### **CHART.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Chart Key	Numeri	1	Yes	Yes		
Patient Key	Numeri	1	FK	Yes		
Administrator User Key	Numeri	1	FK			
Admitting Physician Key	Numeri	1	FK			
Room Key	Numeri	1	FK			PV1[3]
DRG Type Key	Numeri	1	FK			DG1[8]
Admission Age	Short	1				
Admission Height	Alpha	8				
Admission Weight	Alpha	8				
Admission Date	Date	1			dd/mmm/yyyy	EVN[2]
						PV1[44]
Admission Time	Alpha	8			Military	EVN[2]
						PV1[44]
Bed Number	Alpha	8				PV1[3]
Discharge Date	Date	1			dd/mmm/yyyy	PV1[45]
Discharge Time	Alpha	8			Military	PV1[45]
Chart Close Date	Date	1			dd/mmm/yyyy	
Chart Close Time	Alpha	8			Military	
Chart Status	Alpha	8		Yes	Open	
					On-Hold	
					Closed	
DT Rx Patient Browser	Alpha	60		Yes	Room,Bed,Sex,Nam	



**CTRLR.DB****Controller**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Controller Address	Alpha	8	Yes	Yes		
Network Address	Alpha	15	FK	Yes		
Cabinet Key	Numeri	1	FK	Yes		
Controller Type Key	Numeri	1	FK	Yes		

**CTRLRTYP.DB****Controller Type**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Controller Type Key	Numeri	1	Yes	Yes		
Controller Type Description	Alpha	30		Yes	Hook Controller	
					Box Register	
					Manual Register	
					Non System Storage	
					Vial Dispenser	
					Electronic Lock	
					Solids Dispenser	

**DRGTYPE.DB****Diagnostic Related Group**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOURC
DRG Type Key	Numeri	1	Yes	Yes		
Diagnostic Related Group	Alpha	30		Yes		DRG1[

# EVENT.DB

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOURC
Event Key	Numeri	1	Yes	Yes		
Procedure Key	Numeri	1	FK			
Medication Order Key	Numeri	1	FK			
Reason Key	Numeri	1	FK			
Controller Address	Alpha	8	FK	Yes		
Position Key	Short	1	FK	Yes		
User Key	Numeri	1	FK			
Witness User Key	Numeri	1	FK			
Event Date	Date	1		Yes	dd/mmm/yyyy	
Event Time	Alpha	8		Yes	Military	
Delta Quantity	Short	1		Yes		
Up Counts	Short	1		Yes		
Down Counts	Short	1		Yes		
Event Status	Alpha	15		Yes	Adjusted	
					Expired	
					Returned	
					Stocked	
					Taken	
					Wasted	
Wasted Percentage	Numeri	1				
AWS Supply Key	Numeri	1	FK	Yes		
DT Network Address	Alpha	15	FK	Yes		

**HOSSETUP.DB****Hospital Setup**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Hospital Name	Alpha	60			1st Letter	
Hospital Address 1	Alpha	30				
Hospital Address 2	Alpha	30				
Hospital City	Alpha	30			1st Letter	
Hospital State	Alpha	15			1st Letter	
Hospital Zip Code	Alpha	10				
Mono Hospital Logo	Graphi				1"x1" bitmap	
Color Hospital Logo	Graphi				1"x1" bitmap	
Fixed Order Quantity Flag	Alpha	1			Y,N	
ELC Count Remaining Flag	Alpha	1			Y,N	
Archive Period (Months)	Short	1				
Inactivity Timeout (AWS)	Short	1		Yes		
Inactivity Timeout (DT)	Short	1		Yes		
SelecTrac-CL Serial Number	Alpha	15				
SelecTrac-Rx-Serial Number	Alpha	15				
SelecTrac-CL Version Number	Numeri	1			##.##	
SelecTrac-Rx Version Number	Numeri	1			##.##	

**MEDORDER.DB****Medication Order**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Medication Order Key	Numeri	1	Yes	Yes		
Chart Key	Numeri	1	FK	Yes		
Ordering Physician Key	Numeri	1	FK			ORC[1]
Supply Key	Numeri	1	FK			
Placer Order Number	Alpha	15				ORC[2]
Status Key	Alpha	15	FK	Yes	Cancelled	RX1[18]
					Completed	ORC[5]
					Discontinued	
					Not Found	
					On Hold	
					In	
					Replaced	
					In-	
Substitution Status	Alpha	1			Y,N	RX1[17]
Dose	Numeri	1		Yes		RX1[9]
Dose Units	Alpha	8		Yes		RX1[6]
Route	Alpha	15				RX1[3]
Site	Alpha	15				RX1[4]
Frequency	Alpha	15				ORC[7]
Strength	Alpha	15				RX1[6]
Solution Rate	Alpha	15				RX1[5]
Medication Start Date	Date	1			dd/mmm/yyyy	ORC[7]
Medication Start Time	Alpha	8			Military	ORC[7]
Medication Stop Date	Date	1			dd/mmm/yyyy	ORC[7]
Medication Stop Time	Alpha	8			Military	ORC[7]
Order Comments	Memo	240				RX1[28]
Order User Key	Numeri	1	FK			

**MFR.DB****Manufacturer**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Manufacturer Key	Numeri	1	Yes	Yes		
Manufacturer Display Name	Alpha	15		Yes	1st Letter	
Manufacturer Full Name	Alpha	50		Yes	1st Letter	
Manufacturer Address 1	Alpha	30				
Manufacturer Address 2	Alpha	30				
Manufacturer City	Alpha	30			1st Letter	
Manufacturer State	Alpha	15			1st Letter	
Manufacturer Zip Code	Alpha	10				
Manufacturer Country	Alpha	30			1st Letter	

**MFRLIST.DB****Manufacturer List**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Manufacturer List Key	Numeri	1	Yes	Yes		
Manufacturer Display Name	Alpha	15		Yes	1st Letter	
Manufacturer Full Name	Alpha	50		Yes	1st Letter	
Manufacturer Address 1	Alpha	30				
Manufacturer Address 2	Alpha	30				
Manufacturer City	Alpha	30			1st Letter	
Manufacturer State	Alpha	15			1st Letter	
Manufacturer Zip Code	Alpha	10				
Manufacturer Country	Alpha	30			1st Letter	

**NEXTKEY.DB****Next Key**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Event Key	Numeri	1	FK	Yes		
Manufacturer Key	Numeri	1	FK	Yes		
Medication Order Key	Numeri	1	FK	Yes		
Non System Storage Address	Alpha	8	FK	Yes	FF#####	
Patient Key	Numeri	1	FK	Yes		
Procedure Key	Numeri	1	FK	Yes		
Supply Key	Numeri	1	FK	Yes		

**NURSESTA.DB****Nursing Station**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Nursing Station Key	Numeri	1	Yes	Yes		
Nursing Station Number	Alpha	8				
Nursing Station Description	Alpha	30				

**PATIENT.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Patient Key	Numeri	1	Yes	Yes		
Patient ID Number	Alpha	15		Yes		PID[3]
Medical Record Number	Alpha	15				PID[18]
Patient Name Prefix	Alpha	4			1st Letter	PID[5]
Patient First Name	Alpha	15		Yes	1st Letter	PID[5]
Patient Middle Name	Alpha	15			1st Letter	PID[5]
Patient Last Name	Alpha	15		Yes	1st Letter	PID[5]
Patient Name Suffix	Alpha	8				PID[5]
Patient Address 1	Alpha	30				PID[11]
Patient Address 2	Alpha	30				PID[11]
Patient City	Alpha	30			1st Letter	PID[11]
Patient State	Alpha	15			1st Letter	PID[11]
Patient Zip Code	Alpha	10				PID[11]
Patient Country	Alpha	30			1st Letter	PID[12]
Patient Home Phone Number	Alpha	14				PID[13]
Patient Work Phone Number	Alpha	30				PID[13]
Patient Birthdate	Date	1			dd/mm/yy	PID[7]
Patient Gender	Alpha	1			M,F	
Patient Allergies	Alpha	60				

**PHYSICIAN.DB****Physician Procedure**

FIELD NAME	TYPE	SIZE	KEY	RQRD	FORMAT	SOUR
Physician Key	Numeric	1	Yes	Yes		
Physician Name Prefix	Alpha	4			1st Letter Capitalized	PV1[7]
Physician First Name	Alpha	15		Yes	1st Letter	PV1[7]
Physician Middle Name	Alpha	15			1st Letter	PV1[7]
Physician Last Name	Alpha	15		Yes	1st Letter	PV1[7]
Physician Name Suffix	Alpha	8				PV1[7]
Physician Address 1	Alpha	30				
Physician Address 2	Alpha	30				
Physician City	Alpha	30			1st Letter	
Physician State	Alpha	15			1st Letter	
Physician Zip Code	Alpha	10				
Physician Home Phone	Alpha	14				
Physician Work Phone Number	Alpha	30				ORC[1]
Physician Fixed Cost	Money	1				
Music Preference	Alpha	30				

**PHYSPROC.DB****Physician Procedure**

FIELD NAME	TYPE	SIZE	KEY	RQRD	FORMAT	SOUR
Procedure Type Key	Numeric	1	Yes	Yes		
Physician Key	Numeric	1	Yes	Yes		
Physician Procedure Charge	Money	1				
Physician Procedure Cost	Money	1				

**POSGR.DB****Position Group**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Position Group Key	Numeri	1	Yes	Yes		
Position Group Description	Alpha	30		Yes		
Position Group Quantity	Numeri	1				
Group Minimum Quantity	Numeri	1				
Group Maximum Quantity	Numeri	1				

**PROCEDUR.DB****Procedure**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Procedure Key	Numeri	1	Yes	Yes		
Chart Key	Numeri	1	FK	Yes		
Operating Physician Key	Numeri	1	FK			OBR[3]
Attending Physician Key	Numeri	1	FK			PV1[7]
Assisting Physician Key	Numeri	1	FK			OBR[3]
Procedure Type Key	Numeri	1	FK			
Status Key	Numeri	1	FK	Yes	Scheduled	ORC[5]
					Completed	
					Canceled	
Scheduled Start Date	Date	1			dd/mmm/yyyy	OBR[3]
Scheduled Start Time	Alpha	8			Military	OBR[3]
Lab Number	Numeri	1			<999	
Actual Start Date	Date	1			dd/mmm/yyyy	
Actual Start Time	Alpha	8			Military	
Actual End Date	Date	1			dd/mmm/yyyy	
Actual End Time	Alpha	8			Military	
User Key	Numeri	1	FK			
DT CL Patient Browser	Alpha	60		Yes	Lab,Date,Time,Nam	

**PROCTYPE.DB****Procedure Type**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Procedure Type Key	Numeri	1	Yes	Yes		
Procedure Type Number	Numeri	1		Yes		OBR[4]
Procedure Type Name	Alpha	30		Yes		
Procedure Charge	Money	1				OBR[2]
						FT[12]
						FT[22]
Procedure Charge Code	Alpha	8				FT[17]

**REASON.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Reason Key	Numeri	1	Yes	Yes		
Reason Description	Alpha	30		Yes		



**ROOM.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Room Key	Numeri	1	Yes	Yes		
Nursing Station Key	Numeri	1	FK			
Room Number	Alpha	8		Yes		PV1[3]
Room Description	Alpha	30				
Room Charge Per Hour	Money	1				

**STATUS.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Status Key	Numeri	1	Yes	Yes		
Status Description	Alpha	25		Yes		

**SUPLLIST.DB****Supply List**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Supply List Key	Numeri	1	Yes	Yes		
Manufacturer List Key	Numeri	1	FK	Yes		
Manufacturer Part Number	Alpha	15				
Supply Trade Name	Alpha	50				
Supply Generic Name	Alpha	50				
Supply Size	Numeri	1				
Supply Size Units	Alpha	8				

**SUPLPREF.DB****Supply Preference**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Supply Preference Key	Numeri	1	Yes	Yes		
Procedure Type Key	Numeri	1	FK	Yes		
Physician Key	Numeri	1	FK	Yes		
Supply Key	Numeri	1	FK	Yes		
Pre-Op Orders	Alpha	255				
Post-Op Orders	Alpha	255				

**SUPPLIER.DB****Supplier**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Supplier Key	Numeri	1	Yes	Yes		
Supplier Full Name	Alpha	50		Yes	1st Letter	
Supplier Address 1	Alpha	30				
Supplier Address 2	Alpha	30				
Supplier City	Alpha	30			1st Letter	
Supplier State	Alpha	15			1st Letter	
Supplier Zip Code	Alpha	10				
Supplier Country	Alpha	30			1st Letter	
Contact Name Prefix	Alpha	4			1st Letter	
Contact First Name	Alpha	15			1st Letter	
Contact Middle Name	Alpha	15			1st Letter	
Contact Last Name	Alpha	15			1st Letter	
Contact Name Suffix	Alpha	8				
Contact Phone Number	Alpha	14				
Contact Fax Number	Alpha	14				

**SUPPLY.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Supply Key	Numeri	1	Yes	Yes		
Manufacturer Key	Numeri	1	FK	Yes		
Supplier Key	Numeri	1	FK			
Supply Trade Name	Alpha	50		Yes		
Supply Generic Name	Alpha	50				
Hospital Part Number	Alpha	15				
Manufacturer Part Number	Alpha	15				
Manufacturer Lot Number	Alpha	15				
Supply Par Value	Numeri	1				
Supply Fixed Order Quantity	Numeri	1				
Supply Maximum Quantity	Numeri	1				
Supply System Quantity	Numeri	1				
Witness Required Flag	Alpha				Y,N	
Profile Required Flag	Alpha				Y,N	
Supply Size	Alpha	8		Yes		
Supply Size Units	Alpha	8				
Supply Cost	Money	1				
Supply Charge	Money	1				
Drug Role	Alpha	15				RX1[10]
NDC Number	Alpha	15				RX1[14]
DEA Class	Alpha	3			I,II,III,IV,V	RX1[22]
DEA Number	Numeri	1				RX1[23]

**SUPPLYPO.DB****Supply Position**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Controller Address	Alpha	8	Yes	Yes		
Position	Short	1	Yes	Yes		
Position Group Key	Numeri	1	FK			
Supply Key	Numeri	1	FK			
Position Quantity	Numeri	1				
Position Minimum Quantity	Numeri	1				
Position Maximum Quantity	Numeri	1				
Position Description	Alpha	30				
Failed Flag	Alpha	1			Y,N	
Up Counts	Short	1				
Down Counts	Short	1				
DT Supply Description	Alpha	50		Yes		
DT Network Address	Alpha	15	FK	Yes		

**USER.DB**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
User Key	Numeri	1	Yes	Yes		
Access Key	Numeri	1	FK	Yes		
User Name Prefix	Alpha	4			1st Letter	
User First Name	Alpha	15		Yes	1st Letter	
User Middle Name	Alpha	15			1st Letter	
User Last Name	Alpha	15		Yes	1st Letter	
User Name Suffix	Alpha	8				
User System Name	Alpha	15		Yes		
User Card Number	Alpha	9		Yes	Numerals Only	
User PIN Number	Numeri	1		Yes	####	
User Charge Per Hour	Money	1				

**USERDV.DB****User Device**

FIELD NAME	TYPE	SIZE	KEY	RQR	FORMAT	SOUR
Network Address	Alpha	15	Yes	Yes		
Room Key	Numeri	1	FK	Yes		

## **DATA INTEGRITY**

The SelecTrac Systems minimize the requirements for data entry. Instead of requiring many fields, the SelecTrac systems allow the customer to leave them empty. However, some functionality may not be available when the data doesn't exist. For example, Minimum, Maximum, and Par Quantities are not required, but a Below Par report has no usefulness without this data. Since this may be acceptable to customers, the SelecTrac Systems do not make these fields mandatory.

To prevent data loss in the event of a hard disk failure and to keep enough free disk space for the Selectrac Systems to run efficiently, data is periodically archived to tape. The archive will be run on the first day of each month.

The customer can choose an archive period specified in months. For all patient charts that have been closed for the the archive period prior to the first day of the month, the charts and their associated procedures, medication orders, and inventory events will be saved to magnetic tape and deleted from the hard disk.

## **1.6 Graphical User Interfaces**

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There are two types of user interface stations in the SelecTrac Systems:

1. Administrator's Workstation with Keyboard and Mouse
2. Display Terminal with Touch Screen

**The Administrator's Workstation (AWS).** This workstation is a PC running Paradox for Windows. The AWS is where Patient Information is entered and reports are created. The AWS is also where supplies are assigned to storage locations and user profiles are created and maintained. A SelecTrac system may have more than one Administrator's Workstation.

Figure 1.6-1 shows the AWS Menu Structure.

# Main Menu

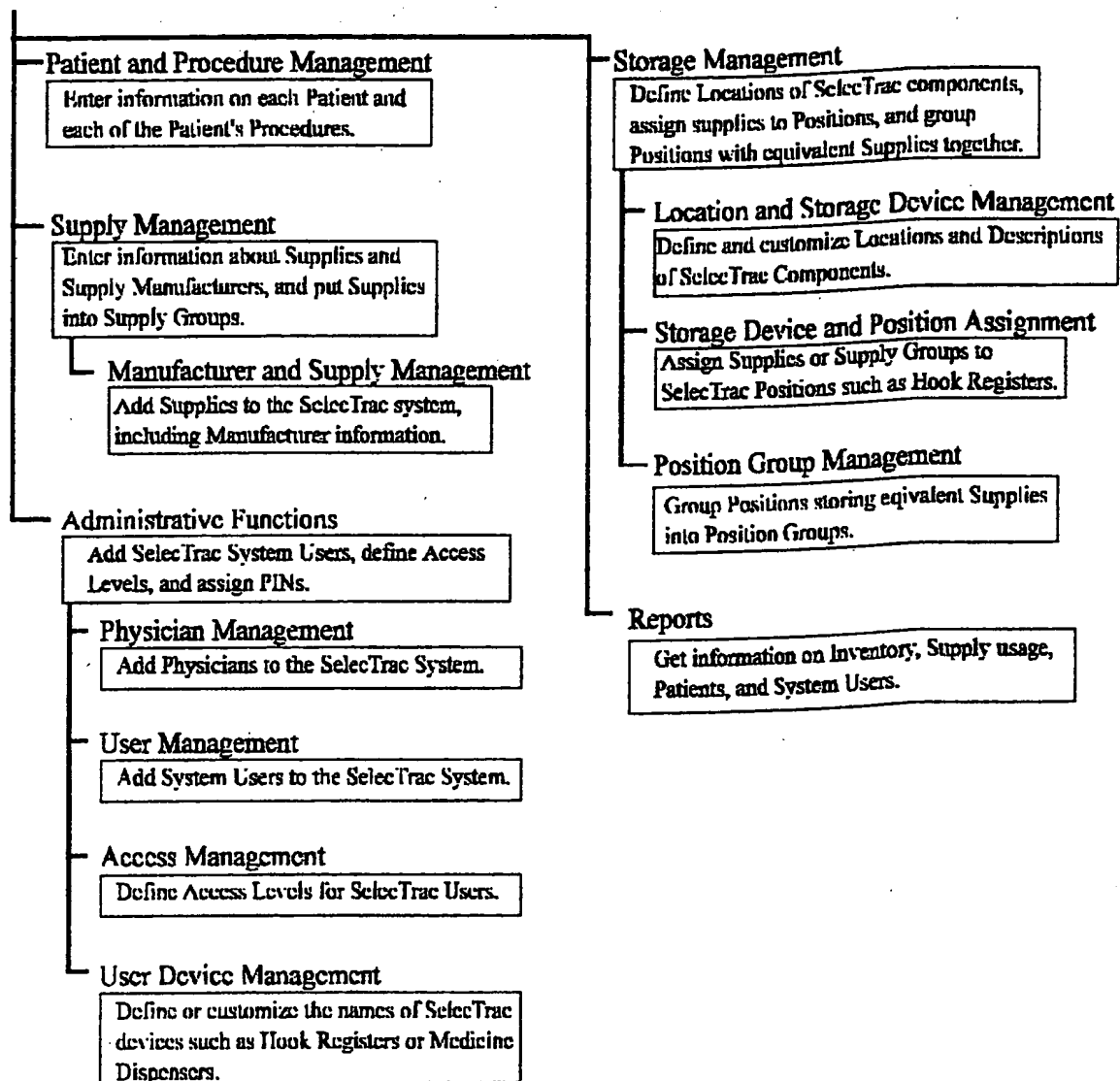
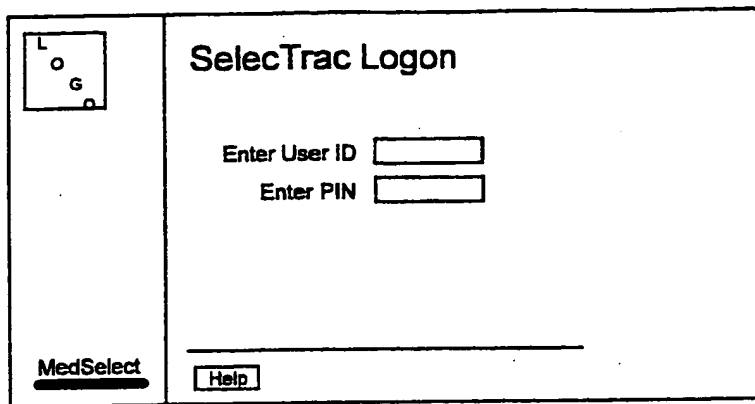


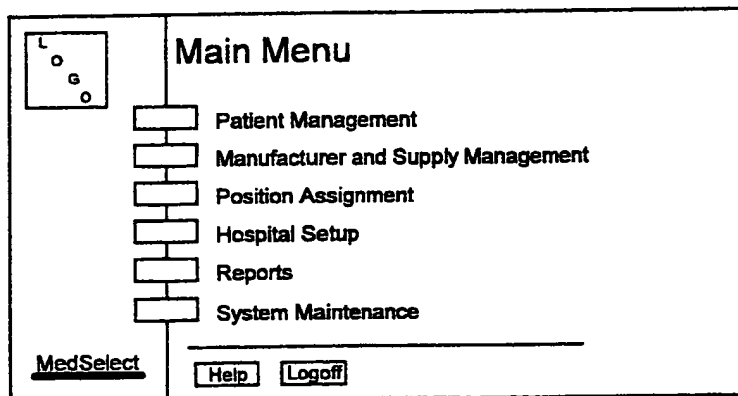
Figure 1.6-1. Administrator's Workstation Menu Structure



The image shows a screenshot of the 'SelectTrac Logon' window. On the left side, there is a logo consisting of a square with the letters 'L', 'O', 'G', and 'O' arranged in a 2x2 grid. Below the logo, the text 'MedSelect' is displayed. The main area of the window is titled 'SelectTrac Logon'. It contains two input fields: 'Enter User ID' and 'Enter PIN', each followed by a rectangular text box. At the bottom left, there is a 'Help' button. A horizontal line is positioned below the input fields.

The Administrator Workstation is a Windows based user interface containing 10 single and multi-form data entry screens. They comprise five functional subsystems:

1. Patient Information Management
2. Manufacturer and Supply Information Management
3. Position Assignment
4. Hospital Setup
5. Reporting
6. System Maintenance (available only to authorized service personnel)



The image shows a screenshot of the 'Main Menu' window. On the left side, there is a logo consisting of a square with the letters 'L', 'O', 'G', and 'O' arranged in a 2x2 grid. Below the logo, the text 'MedSelect' is displayed. The main area of the window is titled 'Main Menu'. It contains a vertical list of six menu items, each preceded by a small rectangular button: 'Patient Management', 'Manufacturer and Supply Management', 'Position Assignment', 'Hospital Setup', 'Reports', and 'System Maintenance'. At the bottom left, there is a 'Help' button and a 'Logoff' button. A horizontal line is positioned below the menu items.

The Patient Management subsystem provides 1 multi-form data entry screen:

For SelecTrac-CL systems:

Name _____		Patient ID _____	
Address _____		Date Admitted _____	
		Time Admitted _____	
		Phone _____	
		Birthdate _____	
Total Procedures _____			
Procedure Number _____		Status _____	
Physician _____		<input type="radio"/> Open <input type="radio"/> Close Date _____ <input type="radio"/> On-Hold <input type="radio"/> Close Time _____ <input type="radio"/> Closed <input type="radio"/> Closed By _____	
Location _____			
Scheduled Start Date _____			
Scheduled Start Time _____			
Help Finish			

☒ Patient  
☐ Procedure  


---

Add  
Add Again  
Finish Add  


---

Edit  
Finish Edit  


---

Search  
Print  


---

< > << >>

**Patient, Procedure, and Chart Management:** This form allows patient information such as the patient id number, name, address, telephone number, birth date and admission date and time to be entered in the upper form and allows procedure information such as the scheduled procedure start date and time, procedure number and procedure status to be entered in the lower form. A physician may be selected from the system physician list and a location from the system location list. Patient Chart information may also be displayed on this form or may be accessed via another subset of this form.

For SelecTrac-Rx systems:

Name _____		Patient ID _____	
Address _____		Date Admitted _____	
		Time Admitted _____	
Birthdate _____		Phone _____	
Medication _____		Med Start Date _____	
Dose _____	Route _____	Med Start Time _____	
Strength _____	Freq. _____	Med End Date _____	
Solution Rate _____		Med End Time _____	
Drug Role _____	NDC Code _____		
Site _____	Physician _____		
Comments _____			
Help Finish			

☒ Patient  
☐ Med Order  


---

Add  
Add Again  
Finish Add  


---

Edit  
Finish Edit  


---

Search  
Print  


---

< > << >>

**Patient Management:** This form allows patient information such as the patient id number, name, address, telephone number, birth date and admission date and time to be entered in the upper form and allows medication orders to be entered in the lower form. Patient Chart information may be accessed via another subset of this form.

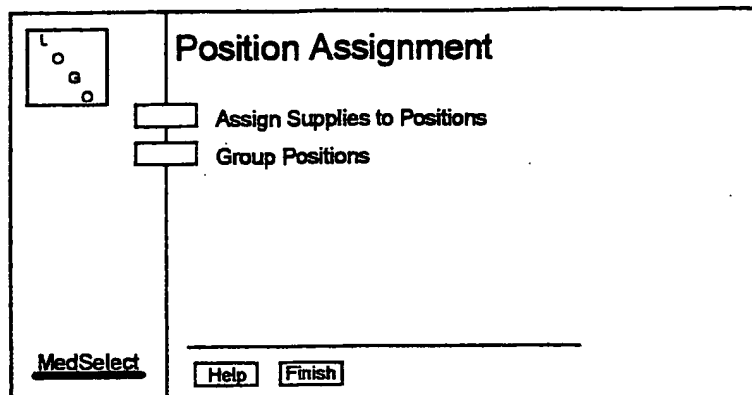
The Manufacturer and Supply Information subsystem provides 1 multi-form data entry screen:

Name _____	
Contact _____	
Address _____	
_____	
Phone _____	
Total Supplies _____	
Description _____	Hospital Part # _____
System Quantity _____	Mfr. Part # _____
Par Quantity _____	Cost _____
Order Quantity _____	
Supply Group _____	
<input type="button" value="Help"/> <input type="button" value="Finish"/>	

☒ Manufacturer  
☐ Supply

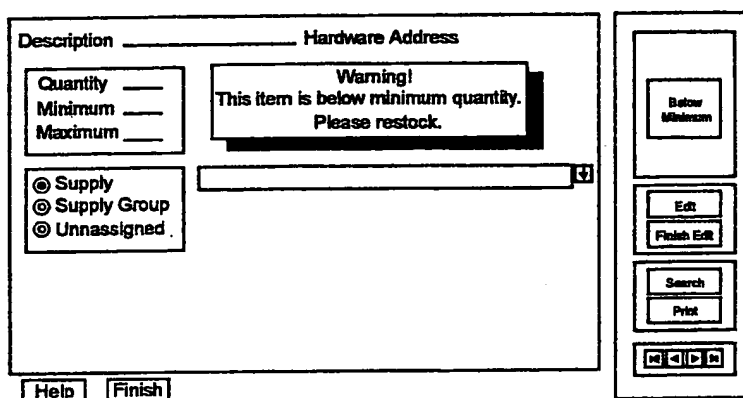
**1. Maintain Manufacturers and Supplies:** The upper form allows data entry of a manufacturer's name, address, contact name and contact telephone number. The lower form accepts supply information such as the manufacturer part number, the hospital part number, a supply description and the supply cost, a par value and fixed order quantity.





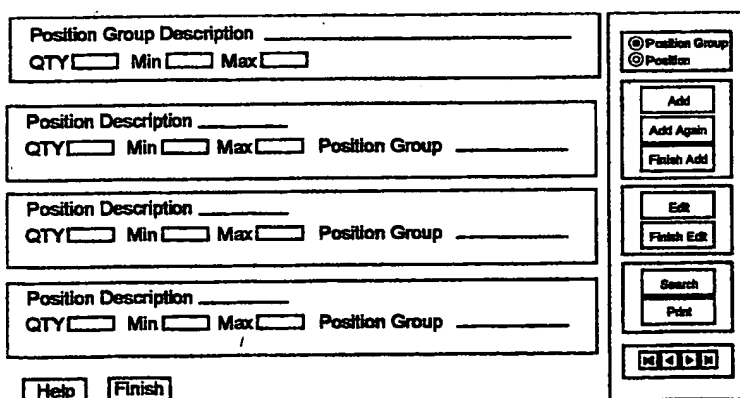
The screen is titled "Position Assignment". In the top left corner, there is a small icon of a storage device. Below the title, there are two main menu items: "Assign Supplies to Positions" and "Group Positions", each preceded by a small rectangular button. At the bottom left, the text "MedSelect" is underlined. At the bottom center, there are two buttons: "Help" and "Finish".

The Position assignment subsystem provides 2 multi-form data entry screens:



This screen is for assigning supplies to positions. It features a "Description" label and a "Hardware Address" label at the top. Below the description label, there are three input fields: "Quantity", "Minimum", and "Maximum". To the right of these fields is a warning box that says "Warning! This item is below minimum quantity. Please restock." Below the input fields, there are three radio buttons: "Supply", "Supply Group", and "Unassigned". A scrollable list box is positioned to the right of the radio buttons. On the right side of the screen, there is a vertical column of buttons: "Below Minimum", "Edit", "Finish Edit", "Search", "Print", and a set of navigation arrows. At the bottom left, there are "Help" and "Finish" buttons.

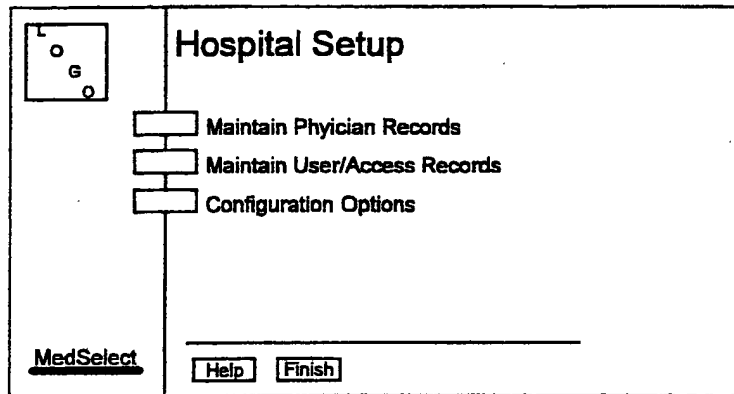
**1. Assign Supplies to Positions:** This form allows a supply to be assigned to a storage device position. If the storage device doesn't automatically detect stocking (medicine dispenser, electronic lock drawer, non-system storage), the position quantity is required.



This screen is for grouping positions. It contains four identical form sections stacked vertically. Each section has a "Position Group Description" label, followed by "QTY" and "Min" input fields, and a "Max" input field. To the right of the "QTY" and "Min" fields is a "Position Group" label. On the right side of the screen, there is a vertical column of buttons: "Position Group", "Position", "Add", "Add Again", "Finish Add", "Edit", "Finish Edit", "Search", "Print", and a set of navigation arrows. At the bottom left, there are "Help" and "Finish" buttons.

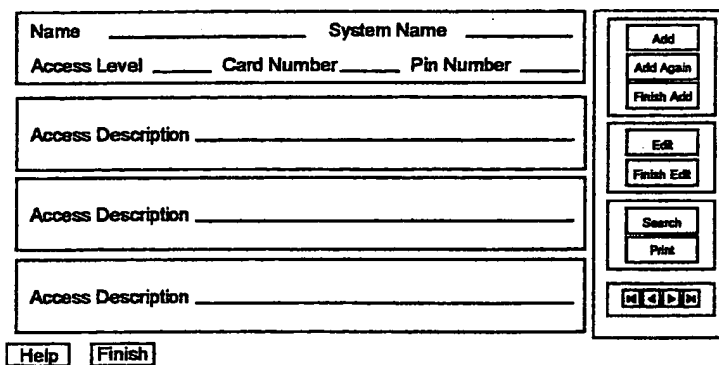
**2. Group Positions:** The upper form allows a position group to be created or modified. If the storage device doesn't automatically detect stocking, the position group quantity is

required. The lower form allows existing positions to be selected from a list and assigned to the position group.



The **Hospital Setup** screen features a logo in the top-left corner consisting of a square with the letters 'L', 'G', and 'O' inside. To the right of the logo, the title **Hospital Setup** is displayed. Below the title, there are three menu items, each preceded by a small rectangular button: **Maintain Physician Records**, **Maintain User/Access Records**, and **Configuration Options**. At the bottom-left, the **MedSelect** logo is present. At the bottom-right, there are two buttons: **Help** and **Finish**.

The Hospital Setup subsystem provides 3 single-form data entry screens:



The **Maintain User/Access Records** form is divided into two main sections. The top section contains input fields for **Name**, **System Name**, **Access Level**, **Card Number**, and **Pin Number**. The bottom section contains three stacked text areas, each labeled **Access Description**. To the right of these input fields is a vertical column of control buttons: **Add**, **Add Again**, **Finish Add**, **Edit**, **Finish Edit**, **Search**, **Print**, and a set of navigation arrows. At the bottom-left of the form, there are **Help** and **Finish** buttons.

**1. Maintain User/Access Records:** This Multiple form allows a user to be added to the system. The user name, user number, and access code are required in the form. The access level must be selected from existing access levels. Only an administration access level user can display this form.

Last Name	First Name	MI

Add  
Add Again  
Finish Add

Edit  
Finish Edit

Search  
Print

< < > >

Help

Finish

**2. Maintain Physician Records:** This single form allows physicians to be added to the system by their full name and includes physician procedures and supply preferences.

Reports	
<input type="checkbox"/> Usage by User	<input type="checkbox"/> Inventory by Location
<input type="checkbox"/> Usage by Location	<input type="checkbox"/> Inventory Summary
<input type="checkbox"/> Usage by Physician	<input type="checkbox"/> Below Minimum Inventory
<input type="checkbox"/> Usage by Patient	<input type="checkbox"/> Below Par
<input type="checkbox"/> Print Supply Labels	

MedSelect

The SelecTrac systems provides 2 low inventory reports:

1. Below Par Report
2. Below Minimum Inventory Report

The Below Par Report compares the system quantity to the supply's par value. If the system quantity is less than par, it is added to the report along with the supply's order quantity.

The Below Minimum Inventory Report first determines the group quantity for each position group and compares the group quantity to the position group's minimum quantity. If the group quantity is less than the group minimum quantity, it is added to the report along with the restock quantity for the position group. The restock quantity is the group maximum quantity minus the group quantity. Then the report determines the position quantity for each position that is not associated with a position group and compares the position quantity to the position's minimum quantity. If the position quantity is less than the position's minimum quantity, it is added to the report along with the position's restock quantity. The position's restock quantity is the position's maximum quantity minus the current position quantity.

The following inserts show each of the report types available on the Reports menu.

The System Maintenance information subsystem can only be accessed by service or technical personnel. This subsystem provides three forms:

Network Address	Location
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Add  
Add Again  
Finish Add

Edit  
Finish Edit

Search  
Print

< < > >

**1. Assign Interface Addresses:** This single form allows definition of interface hardware addresses for any Display Terminals

Room Number _____ Room Description _____	<div style="border: 1px solid black; padding: 5px;"> <input checked="" type="radio"/> Location  <input checked="" type="radio"/> Supply Device  <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Add Add Again Finish Add </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Edit Finish Edit </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Search Print </div> <div style="border: 1px solid black; padding: 2px;"> &lt; &lt; &gt; &gt; </div> </div>
Description _____ Supply Device Type _____ Location _____	
Description _____ Supply Device Type _____ Location _____	
Description _____ Supply Device Type _____ Location _____	

**2. Maintain SelecTrac Locations:** The upper form allows hospital locations to be defined by room number and description. The lower form allows storage devices to be defined by device type and description. It also allows the device to be assigned to a location. This multi-form screen is only accessible by system service personnel.

**3. Create Dispensing Positions:** This multiple record form provides the ability to create and define dispensing positions that will exist on a new system

**The Display Terminal.** The Display Terminal provides a "Touch Screen" graphical user interface. Display Terminals will be placed strategically to provide information at the time and place where it is needed most. This interface design supports both the SelecTrac-CL and SelecTrac-Rx products and attempts to make the "look and feel" as similar as possible.

**Table 1.6-1** shows the forms on the SelecTrac-CL and SelecTrac-Rx systems.

SelecTrac-CL	SelecTrac-Rx
Logon	Logon
Patient Browser	Patient Browser
Patient Info	Patient Profile
Physician Card	Medication Order
Patient Usage	Patient Usage
	Supply Browser
	Supply Information

## SELECTRAC-CL TOUCH SCREEN:

Please Swipe Card Or Enter User ID:

1	2	3
4	5	6
7	8	9
CLEAR	0	CANCEL

ENTER

**Figure 1.6-3. The SelecTrac Logon Screen**

The first form encountered by a user is the Logon form (Figure 1.6-3). The Logon form has a keypad graphic that may be used to enter a User ID Number. This number could also be automatically read into the system by a magnetic card reader or bar code reader that are options supported by SelecTrac. The current magnetic card reader only reads track 2 which can only be the numbers 0 through 9, the question mark (?) as a string start character, the equals sign (=) as a field separator and the semicolon (;) as the end of string character. When the Logon form is displayed for more than 30 seconds, a screen saver program is activated. Touching the screen will bring up the Logon form again.

After the User ID Number has been entered, the Logon form validates the User ID Number against the user's profile on the Database Server. If the number is invalid, a message indicating that the Logon has failed appears, and the Logon form is again presented to allow the next Logon attempt. If the number is valid, the Patient Browser form is activated.

While the Patient Browser forms are similar for the SelecTrac-CL and SelecTrac-Rx systems, they are not identical. The SelecTrac-CL Patient Browser form (see Figure 1.6-4) displays patients that are scheduled for procedures in a Cath Lab.

Lab	Date	Time	Patient Name	Patient ID
1	12/15	8:00	Johnson, Peter	14-2031
1	12/15	10:00	Carr, Robert	14-2040
1	12/15	11:00	Murray, Lisa	14-2100
2	12/15	12:00	Coventry, Sarah	14-2130
2	12/15	13:00	Pelletier, Lawrence	14-2132
2	12/15	14:00	Schafer, James	14-2400
3	12/15	15:00	Scott, Anna	14-2435
3	12/15	16:00	Walker, Michael	14-2455

Select

Patient Info

↑

↓

Help

Dispense

Physician

Expired

Logout

**Figure 1.6-4. SelecTrac-CL Patient Browser**

The Patient Browser is a multiple page form to allow for any number of patients to simultaneously be in the system. Ten patients can be displayed on a single page with each patient on one line of the form with the following information and positions:

Column 1- 3	Lab Number
Column 5- 9	Scheduled Date
Column 11-15	Scheduled Time
Column 17-46	Patient Name
Column 48-59	Patient ID
Column 60-80	Buttons

The form displays these patients sorted first by lab, then by date and time so that they are in the scheduled order for ease of selection. This sorting order also provides a current schedule everywhere there is a SelecTrac-CL Display Terminal. Touching anywhere on the line that displays a patient's name and ID number indicates that this is the patient the user is referring to. Successive button actions will apply to this patient.

There are nine graphical buttons on the SelecTrac-CL Browser form, four on the bottom and five on the right hand side starting in column 60. Touching each button has the following effect:

1. **SELECT** Supplies are automatically assigned to the selected patient. A Patient Usage form displaying supplies as they are taken or returned is displayed while in Select mode.
2. **PATIENT INFO** Displays the profile for this patient
3. **UP ARROW** Returns to the previous page of patients
4. **DOWN ARROW** Advances to the next page of patients
5. **HELP** Provides online instructions about using the current form
6. **EXPIRED** Activates the inventory mode for handling expired supplies
7. **PHYSICIAN** Displays the list of supplies normally required for this procedure by the scheduled physician and the physician's music preference.



- |             |  |
|-------------|--|
| 8. DISPENSE | Activates SelecTrac-Rx dispensing functions from SelecTrac-CL. |
| 9. LOGOUT   | Logs out and Returns to the Logon screen                       |

The Patient Usage form displays supplies that were taken and returned against a patient's account. The Patient Usage form is a multiple page form to allow for any number of supplies to simultaneously be displayed for a patient.

Item	Status	Supply Name	Manufacturer	QTY
1	Taken	SF LA0 Guide	Baxter	1
2	Taken	SF Voda VL 3.5	Sci-Med	1
3	Taken	SF AL1 Guide	Baxter	1
4	Returned	SF AL1 Guide	Baxter	1
5	Taken	SF AL2 Guide	Baxter	1

Wasted

↑

↓

Help

Finish

**Figure 1.6-5. SelecTrac-CL Patient Usage Form**

Ten supplies can be displayed on a single page with each supply on one line of the form with the following information and positions:

Column 1- 4	Item Number (A sequential number assigned for reference)
Column 6- 13	Status
Column 15-52	Supply / Manufacturer
Column 54-59	Quantity
Column 60-80	Buttons

There are 3 graphical buttons on the SelecTrac-CL Patient Usage form starting in column 60. Touching each button has the following effect:

- |               |   |
|---------------|---|
| 1. UP ARROW   | Returns to the previous page of supplies used |
| 2. DOWN ARROW | Advances to the next page of supplies used    |
| 3. FINISH     | Returns to the Patient Browser form.          |

The Patient Profile form is a single page form that displays the following:

Patient Name: Doe, John A	Patient ID Number: 9283546
Gender: Male	Med Record Number: 003546
Age: 52	Date Admitted: 2/3/94
Height: 180.23 cm	Time Admitted: 13:00
Weight: 50.1 kg	Room #: 476
Birthdate: 01/05/40	Bed #: 2
Allergies: penicillin	
Referral Physician: Dr. Smith	

**Figure 1.6-6. *SelecTrac-CL Patient Profile***

There is 1 graphical button on the SelecTrac-Rx Patient Profile form, starting in column 60. Touching this button has the following effect:

1. **FINISH** Returns to the Patient Browser form.

The Physician Card form displays supplies that are generally used by a physician for a particular type of procedure. The Physician Card form is a multiple page form to allow for any number of supplies to simultaneously be displayed.

Physician Name		Music Preference
Procedure Name		
Item	Supply Name	Manufacturer
		<input type="button" value="↑"/> <input type="button" value="↓"/>  <input type="button" value="Finish"/>

**Figure 1.6-7. *SelecTrac-CL Physician Card***

Ten supplies can be displayed on a single page with each supply on one line of the form with the following information and positions:

Column 1- 4	Item Number (A sequential number assigned for reference)
Column 6- 13	Status
Column 15-52	Supply / Manufacturer
Column 54-59	Number
Column 60-80	Buttons

## SELECTRAC-Rx TOUCH SCREEN:

The first form encountered by a user is the Logon form (Figure 1.6-3). The Logon form has a keypad graphic that may be used to enter a User ID Number. This number could also be automatically read into the system by a magnetic card reader or bar code reader that are options supported by SelecTrac. The current magnetic card reader only reads track 2 which can only be the numbers 0 through 9, the question mark (?) as a string start character, the equals sign (=) as a field separator and the semicolon (;) as the end of string character. When the Logon form is displayed for more than 30 seconds, a screen saver program is activated. Touching the screen will bring up the Logon form again.

After the User ID Number has been entered, the user is prompted to enter a Personal Identification Number (PIN) using the graphical keypad. After the PIN has been entered, the Logon form validates the User ID Number and PIN combination against the user's profile on the Database Server. If the combination is invalid, a message indicating that the Logon has failed appears, and the Logon form is again presented to allow the next Logon attempt. If the combination is valid, the Patient Browser form is activated. The SelecTrac-Rx Logon times out after the hospital specified timeout period (for instance, 1 minute) of inactivity as a security measure.

Room	Bed	Sex	Patient Name	Patient ID		
1011	1	M	Johnson, Peter	14-2031	Select	
1011	2	M	Carr, Robert	14-2040	Patient Info	
1012	1	F	Murray, Lisa	14-2100		
1012	2	F	Coventry, Sarah	14-2130	↑ ↓	
1018	2	M	Pelleker, Lawrence	14-2132		
1018	3	M	Schafer, James	14-2400	Help	
1017	1	F	Scott, Anna	14-2435		
1017	3	F	Walker, Michael	14-2455		
					Usage	Logout

**Figure 1.6-8. *SelecTrac-Rx Patient Browser***

While the Patient Browser forms are similar for the SelecTrac-CL and SelecTrac-Rx systems, they are not identical.

The SelecTrac-Rx Patient Browser form (see Figure 1.6-8) displays patients assigned to each nursing station. The Patient Browser is a multiple page form to allow for any number of patients to simultaneously be in the system. Ten patients can be displayed on a single page with each patient on one line of the form with the following information and positions:

Column 1- 4	Room Number
Column 6- 8	Bed Number
Column 10-15	Sex

Column 17-46	Patient Name
Column 48-59	Patient ID
Column 60-80	Buttons

The SelecTrac-Rx Patient Browser form displays these patients sorted 1st by room, then by bed. Touching anywhere on the line that displays a patient's name and ID number indicates that this is the patient the user is referring to. Button actions will apply to this patient.

There are 7 graphical buttons on the SelecTrac-Rx Patient Browser form, starting in column 60. Touching each button has the following effect:

- |                 |   |
|-----------------|---|
| 1. SELECT       | Supplies are automatically assigned to the selected patient and the Supply Browser form is activated. |
| 2. PATIENT INFO | Displays the profile for this patient   |
| 3. UP ARROW     | Returns to the previous page of patients  |
| 4. DOWN ARROW   | Advances to the next page of patients   |
| 5. HELP         | Provides online instructions about using the current form   |
| 6. USAGE        | Displays the supplies that have been charged to a patient   |
| 7. LOGOUT       | Logs out and Returns to the Logon screen  |

The Patient Profile form displays the following patient information:

Patient Name: Doe, John A	Patient ID Number: 9263546
Gender: Male	Med Record Number: 003546
Age: 52	Date Admitted: 2/3/94
Height: 190.23 cm	Time Admitted: 13:00
Weight: 50.1 kg	Room #: 476
Birthdate: 01/05/40	Bed #: 2
Allergies: penicillin	
Referral Physician: Dr. Smith	
	<input type="button" value="Orders"/> <input type="button" value="Finish"/>

**Figure 1.6-9. SelecTrac-Rx Patient Profile**

There are 2 graphical buttons on the SelecTrac-Rx Patient Profile form, starting in column 60. Touching each button has the following effect:

- |           |                                      |
|-----------|--------------------------------------|
| 1. ORDERS | Activates the Medication Orders form |
| 2. FINISH | Returns to the Patient Browser form. |

The Medication Order form is activated by the ORDERS button on the Patient Profile Form. The Medications Order form is a multiple page form to allow for any number of med orders to simultaneously be displayed for a patient. Five med orders sorted with the PRNs listed last can be displayed on a single page. Each supply on one line of the form will display the following information and positions:

Line 1 Column 1-20	Trade Name
Line 2 Column 1-20	Generic Name
Line 1 Column 22-26	Order Number (Assigned by pharmacy system)
Line 2 Column 22-26	Order Quantity
Line 1 Column 28-36	Dose/Units
Line 2 Column 28-36	Unit Dose/Units
Line 1 Column 38-44	Route
Line 2 Column 38-44	Freq
Line 1 Column 46-59	Start Date/Time
Line 2 Column 46-59	End Date/Time

Patient Name: Doe, John A.		Patient ID: 1233548				Dispense
Trade Name	Order Qty	Dose Unit Dose	Route Freq	Start	End	
Zestril	7322	350mg	oral	6/5/94	14:00	Med Info
Lisinopril	1	350mg	QD	6/5/94	11:00	
Dilantin	7325	100mg	oral	6/5/94	15:00	Up Arrow
Phenytoin	2	50mg	BID	6/7/94	12:00	Down Arrow
Darvocet	7330	65/650	oral	6/5/94	15:00	Help
Wyggesto	1	65mg	PRN	6/5/94	18:00	Finish

Figure 1.6-10. *SelecTrac-Rx Medication Order Form*

The Medication Order form has three graphical buttons, starting in column 60. Touching each button has the following effect:

- 1. DISPENSE** A unit dose of the selected supply is dispensed or an Electronic Lock Cabinet drawer is opened. If the supply is in an electronic lock cabinet, the user is prompted to enter the quantity taken on a graphical keypad. If this supply requires a witness before dispensing (2nd PIN required flag), the Logon form will be displayed so that a 2nd user may logon as a witness. After the witness is verified, dispensing proceeds. If the hospital wants the remaining count verified (ELC count required flag), then the user will be prompted to enter the count remaining in the opened drawer. In either case, the supplies are automatically assigned to the selected patient.
- 2. MED INFO** Displays the Medication Order for this supply (see Figure 1.6-11)
- 3. UP ARROW** Returns to the previous page of medication orders
- 4. DOWN ARROW** Advances to the next page of medication orders
- 5. HELP** Provides online instructions about using the current form
- 6. FINISH** Returns to the Patient Browser form.

The Supply Browser form is a multiple page form to allow for any number of supplies and medicines to simultaneously be in the system. The Supply Browser is not accessible at hospitals that choose the "med order only" option in the hospital configuration table.

Brand Name	Generic Name	Strength	Form
Demoral	meperidine	50mg	tablet
Demoral	meperidine	75mg	tablet
Sublimaze	fentanyl	2 ml x 1	ampoule
Sublimaze	fentanyl	5ml	ampoule
Sublimaze	fentanyl	30 ml	ampoule
Versed	midazolam	2mg/2ml	vial
Versed	midazolam	10mg/2ml	vial
Versed	duramorph	5mg/10ml	ampoule

**Figure 1.6-11. *SelecTrac-Rx Supply Browser***

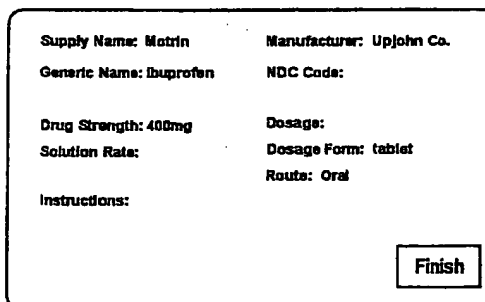
Ten supplies can be displayed on a single page with each supply on one line of the form with the following information and positions:

Column 1-20	Supply Name
Column 22-41	Generic Name
Column 43-51	Strength
Column 53-59	Form
Column 60-80	Buttons

There are 7 graphical buttons on the SelecTrac-Rx Supply Browser form, starting in column 60. Touching each button has the following effect:

- 1. DISPENSE** A unit dose of the selected supply is dispensed or an Electronic Lock Cabinet drawer is opened. If the supply is in an electronic lock cabinet, the user is prompted to enter the quantity taken on a graphical keypad. If this supply requires a witness before dispensing (2nd PIN required flag), the Logon form will be displayed so that a 2nd user may logon as a witness. After the witness is verified, dispensing proceeds. If the hospital wants the remaining count verified (ELC count required flag), then the user will be prompted to enter the count remaining in the opened drawer. In either case, the supplies are automatically assigned to the selected patient.
- 2. MED INFO** Displays the Medication Order for this supply (see Figure 1.6-11)
- 3. UP ARROW** Returns to the previous page of patients
- 4. DOWN ARROW** Advances to the next page of patients
- 5. RESTOCK** Activates the inventory mode for restocking supplies
- 6. HELP** Provides online instructions about using the current form
- 7. FINISH** Returns to the Patient Browser form

The Supply Information form is a single page form that provides more extensive information about various supplies and medications including manufacturer's instructions:



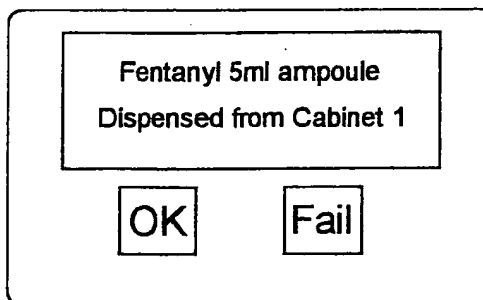
A screenshot of a software form titled "Supply Information". The form is enclosed in a rectangular border. Inside, there are two columns of text. The left column contains: "Supply Name: Motrin", "Generic Name: Ibuprofen", "Drug Strength: 400mg", "Solution Rate:", and "Instructions:". The right column contains: "Manufacturer: Upjohn Co.", "NDC Code:", "Dosage:", "Dosage Form: tablet", and "Route: Oral". At the bottom right of the form, there is a button labeled "Finish".

Supply Name: Motrin	Manufacturer: Upjohn Co.
Generic Name: Ibuprofen	NDC Code:
Drug Strength: 400mg	Dosage:
Solution Rate:	Dosage Form: tablet
	Route: Oral
Instructions:	

Finish

**Figure 1.6-12. The SelectTrac-Rx Supply Information Form**

When a supply is dispensed, an acknowledgement form will be displayed:



A screenshot of a software form titled "Acknowledgement". The form is enclosed in a rectangular border. Inside, there is a central box containing the text: "Fentanyl 5ml ampoule" and "Dispensed from Cabinet 1". Below this box, there are two buttons labeled "OK" and "Fail".

Fentanyl 5ml ampoule  
Dispensed from Cabinet 1

OK Fail

**Figure 1.6-13. The SelectTrac Acknowledgement Form**

The acknowledgement form has two graphical buttons. Touching each button has the following effect:

1. OK Returns to the Rx Supply Browser
2. Fail Returns to the Rx Supply Browser

The Patient Usage form is activated by the Usage button on the patient browser. The Patient Usage form displays supplies that were taken, returned, and wasted against a patient's account. The Patient Usage form is a multiple page form to allow for any number of supplies to simultaneously be displayed for a patient. Ten supplies can be displayed on a single page with each supply on one line of the form with the following information and positions:

Column 1- 4	Item Number (A sequential number assigned for reference)
Column 6- 13	Status
Column 15-34	Supply Name (Brand Name)
Column 36-54	Generic Name
Column 56-59	PCT (Percentage Used)
Column 60-80	Buttons

Item	Status	Supply Name	Generic Name	PCT	
1	Taken	Zestril	Lisinopril	100	Returned
2	Taken	Dilantin	Phenytoin Sodium	100	
3	Taken	Darvocet	Wygesic	100	Wasted
4	Returned	Darvocet	Wygesic	100	
5	Taken	Nuvolin-R	Insulin	100	<input type="button" value="Up Arrow"/> <input type="button" value="Down Arrow"/>
6	Wasted	Nuvolin-R	Insulin	25	
					Help
					Finish

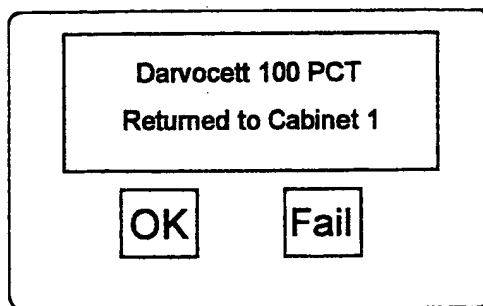
**Figure 1.6-14. The SelecTrac-Rx Patient Usage Form**

There are 6 graphical buttons on the SelecTrac-Rx Patient Usage form, on the right hand side starting in column 60. Touching each button has the following effect:

1. RETURNED Credits the supply to the patient originally charged and opens the return drawer.
2. WASTED A graphical keypad will allow the user to enter the amount wasted as a percentage of the total supply. This will be recorded on the Patient Usage form and the amount wasted will be deducted from the original 100% charged.
3. UP ARROW Returns to the previous page of supplies used
4. DOWN ARROW Advances to the next page of supplies used
5. HELP Provides online instructions about using the current form
6. FINISH Returns to the Patient Browser form



When a supply is returned, an acknowledgement form will be displayed:



Darvocett 100 PCT  
Returned to Cabinet 1

OK Fail

---

**Figure 1.6-15. *The SelecTrac Acknowledgement Form***

The acknowledgement form has two graphical buttons. Touching each button has the following effect:

1. OK Returns to the Rx Patient Usage Form
2. Fail Returns to the Rx Patient Usage Form

The Wasted Medication form is activated by the Wasted button on the Patient Usage form. The Patient Usage form displays up to 10 reasons per page that a medication would be wasted. These reasons may be changed at the AWS to meet the hospital's needs. The appropriate reason is touched then the percentage wasted is entered on the graphical keypad. Touching the enter graphical Enter key records the information and returns to the Patient Usage form.

Select reason and enter percentage wasted:

<div> <div>▲</div> <div>▼</div> </div>	Broken	1	2	3
	Cancelled			
	Contaminated	4	5	6
	Dropped			
	Expired	7	8	9
	Partial Dose			
	Refused			
		CLEAR	0	CANCEL
		ENTER		

**Figure 1.6-16. *The SelecTrac-Rx Wasted Supplies Form***



## 1.7 Reports

Reports may be generated automatically at user specified times or on demand. There are three types of Reports:

### 1. Supply Usage Reports

#### Usage Report by Patient

Documents the patient name, procedure number, procedure status, event location, procedure physician, the date and time of the event, the supply description, the quantity used, and the system user who took the supply. Click on the Usage Report by Patient button to print a copy of this report.

<i>Name:</i>	<i>Patient ID:</i>
<i>Address:</i>	
<i>Phone:</i>	<i>Admission Date:</i>
<i>Birthdate:</i>	<i>Admission Time:</i>
<i>Procedure:</i>	<i>Scheduled Start Date:</i>
<i>Procedure Status:</i>	<i>Scheduled Start Time:</i>
<i>Location:</i>	
<i>Physician:</i>	

Date	Time	Description	QTY	System Operator

#### Usage Report by User

Documents the user name, a procedure description, the supply description, the quantity used, and the event location. Click on the Usage Report by User button to print a copy of this report.

<b>PATIENT NAME</b>					
Date	Time	Description	QTY	Location	System Operator

**Usage Report by Location**

Documents the location, date, time, supply description, quantity, patient, procedure number, user, and physician. Click on the Usage Report by Location button to print a copy of this report.

**LOCATION NAME**

Date	Time	Description	QTY	Patient	Case	Physician	Operator

**Usage Report by Physician**

Documents for each procedure type, the physician name, event date and time, the supply description, the quantity used, and the event location. Click on the Usage Report by Physician button to generate a copy of this report.

**PHYSICIAN NAME**

Date	Time	Description	QTY	Location	Patient

**Medication Administration Report (MAR)**

Documents the patient name, patient ID, patient height, patient weight, gender, allergies, the medication order, start date and time, frequency, stop date and time, medication name, strength, administration site, instructions, who dispensed the medication, and at what time it was dispensed. Click on the MAR button to print a copy of this report.

Order #	Start Date	Start Time	Drug Name	Strength	User Name
Frequency	Stop Date	Stop Time	Instructions	Site	Dispense Time

**Wasted Medication Report**

Documents the date and time the medication was indicated as wasted, the medication description, the quantity wasted, the reason it was wasted, the user who wasted the medication, and the witness user, if required. Click on the Wasted Report button to print a copy of this report.

Date	Time	Description	QTY	Username	Witness	Reason

## 2. Inventory Reports

### Inventory Report by Location

Documents the supply description, the system position, the minimum quantity at that position, the maximum quantity at that position, and the on-hand quantity. Click on the Inventory Report by Location button to print a copy of this report.

<b>Room:</b>				
<b>Supply Device:</b>				
Description	Position	On-Hand	Min QTY	Max QTY

### Inventory Summary Report

Documents the supply description, the on-hand quantity, the par value of the supply, and the fixed order quantity. Click on the Inventory Summary Report button to print a copy of this report.

<b>Manufacturer:</b>			
Supply Description	System QTY	Par QTY	Order QTY

### Below Minimum Inventory Report

Documents the supply description, the system position, the maximum quantity at that position, the on-hand quantity, and the restock quantity. Click on the Restock List by Location button to generate a copy of this report.

Position Description	Supply Description	Total QTY	Min QTY	Restock QTY

#### **Below Par Report**

Documents the supply description, the on-hand quantity, the par value, and the order quantity of all supplies that are at or below par. The order quantity is the Fixed Order Quantity if the Fixed Order Quantity Flag (in the Hospital Setup Table) is true. If not, the Order Quantity is calculated to be the Maximum Quantity - Current Quantity. Click on the Below Par Report button to generate a copy of this report.

Supply Description	Total QTY	Par QTY	Order QTY

### **3. Statistical Graphic Reports**

The following is an anticipated list of statistical reports:

#### **SelecTrac-CL:**

- PTCA's performed per period of time.
- Quantity and cost of each Catheter Type per period of time.
- Number of procedures performed by each physician per period of time.
- Average Cost per physician per procedure type per period of time.

#### **SelecTrac-Rx:**

- Drugs used by Diagnostic Related Group (DRG)

## 1.8 Warnings/Alarms

---

Inventory Alarms are issued in three ways:

1. When the administrator logs into the Administrator's Workstation
2. When the inventory menu is selected
3. Periodically printed reports

There are two inventory alarm conditions:

1. **Below Par:** A supply has fallen below the par value system-wide for that supply. If so, a warning is issued to the AWS that includes the order quantity for this supply.

For dispensing units and electronic lock drawers, the quantity remaining after dispensing is compared to the par value for the supply that was dispensed and an alarm is issued to the display terminal that dispensed the supply.

2. **Below Minimum Inventory:** A supply has fallen below the minimum quantity at a specific storage location (a particular hook, a particular dispenser magazine, etc.) or group of storage locations belonging to a position group. A warning is issued to the AWS that includes the quantity required to restock. The restock quantity equals the maximum quantity minus the current quantity at that position or position group.

(Restock Quantity = Maximum Quantity - Position Quantity)

There is one system alarm condition:

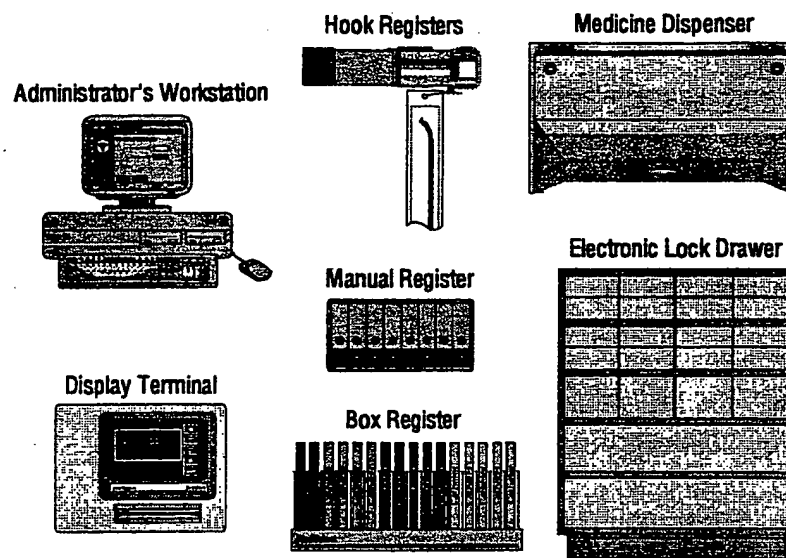
1. **System Component Failure:** The diagnostic subsystem has detected that a system component may have failed.





## 1.9 Systems Communications

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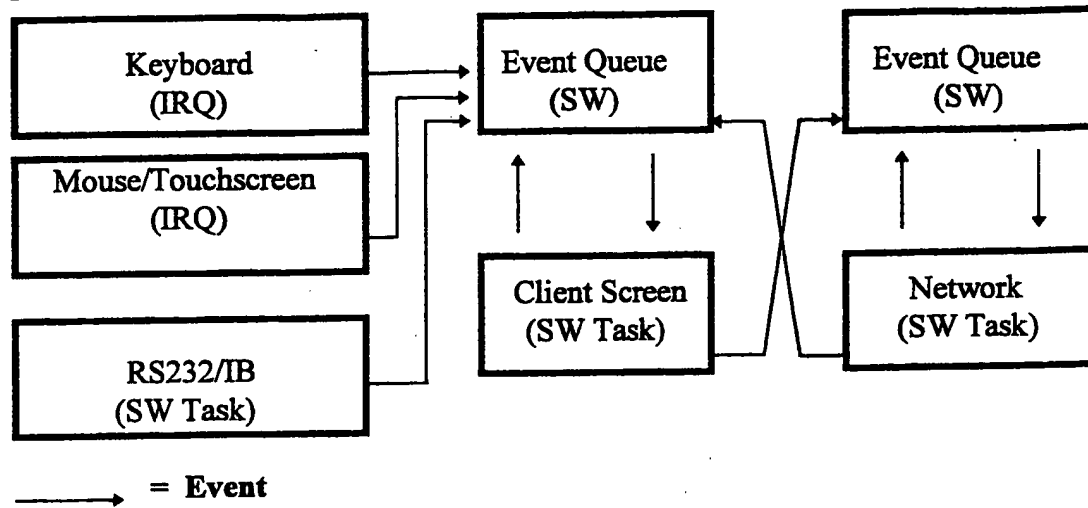


**Figure 1.9-1. *The SelecTrac System***

- **Hooks to hook controllers:** The microprocessors in each Hook Register are wired in series on a ribbon cable. They are polled (asked for data) periodically by the hook controller. The polling software was developed by MedSelect. The hook microprocessors respond to the hook controller with the accumulated inventory changes at each microprocessor since the last time the controller polled it. Each hook controller can communicate with 16 hooks. Multiple hook controllers are wired in series with flat cable and RJ45 plug connectors.
- **Hook Controllers to Display Terminals:** Hook controllers communicate with display terminals through a MedSelect proprietary interface board called the IBPC (Inventory Bus Protocol Converter). The IBPC resides inside the display terminal and is connected to the display terminal's bus with a ribbon bus cable. The hook controllers are wired in parallel with a single connection directly onto the IBPC in the display terminal. It is a 4-wire connection, where 2 wires (send and receive) provide communications and two wires (live and ground) provide power to the hook controllers. Each display terminal has an IBPC connected to serial communication port 1 (COM1:) by a ribbon cable. In addition to protocol conversion, the IBPC provides error and collision detection on the inventory bus.
- **Box Registers to Display Terminals:** Box registers are wired in parallel by ribbon cable with a single connection directly onto the IBPC in the Display Terminal. Like the hook controller connection, a 4-wire connection provides communications and power to the Box Registers.

- **Manual Registers to Display Terminals:** Communicate the same way as box registers. Box registers and manual registers can be wired in parallel on the same line going to the display terminal.
- **Dispensers with Display Terminals:** Also communicate through the IBPC.
- **Display Terminals with Database Server:** Display terminals communicate with the database server via 10-base-T ethernet (RG58 thinwire, AUX thickwire & token ring are also supported.. Ethernet provides the capability to have virtually unlimited numbers of display terminals communicating with the database server. Each display terminal will have a 3COM ethernet controller which is connected to the display terminal's bus by a ribbon bus cable. The ethernet board then connects to the ethernet by a 10-base-T cable to a multi-port communication hub. The communications software is LanTastic/AI by Artisoft (TCP/IP, Novell and other protocols are also supported).
- **Administrator Workstations with Database Server:** The Administrator's Workstations communicate with the Database Server using ethernet and LanTastic/AI (and other supported networks). The database is read and written to using Borland's Paradox for Windows (Run-time) software and MedSelect client-server software.
- **Admission-Discharge-Transfer (ADT) System Interface:** This interface is not yet defined and may be hospital specific. Patient admission information will be provided to the MedTrac Systems from the ADT.
- **Hospital Information System (HIS) System Interface:** This interface is not yet defined and may be hospital specific. Patient/Procedure information will be sent to the HIS when the procedure is closed.
- **MedSelect Diagnostic Interface:** This interface allows MedSelect engineers to access a customer's system remotely. This is accomplished by using internal 14.4 Kbaud modems on an analog telephone line. The software used is Symantec's PC-Anywhere for Windows which allows a MedSelect engineer to connect to the Administrator's Workstation to diagnose problems.

## Display Terminal Communications



## DATA OBJECTS

What follows is a short description of the various software objects which participate in the Client/Server communication.

### **OBJECT      Guion**

#### **DESCRIPTION**

A Guion (pronounced Goo-ee-on) is the elementary user interface element. Every item (button, text, etc.) displayed on the GUI is a Guion or an object which is a descendent of the Guion.

A Guion has the following attributes :

1. An ID which identifies it to the Client GUI, and to the Server.
2. A pair of position coordinates which define the area of the GUI which the Guion occupies.
3. Text which may be displayed.
4. The color to be used to draw the Guion.
5. The font to be used to write the text.
6. A flag to indicate whether the Guion has a border.
7. A flag to indicate whether the Guion is visible/invisible.
8. A flag to indicate whether the Guion is selectable or not.
9. A flag to indicate whether the Guion should flash when selected.
10. A flag to indicate whether the Guion should invert when selected.
11. A command value which is sent to the server when the Guion is

selected.

The Guion is a convenient way to implement a variety of user interface elements which otherwise may seem very disparate.

**BUTTON:** A button is a Guion with text and a border; it is visible, selectable, and flashable, but not invertable.

**TEXT:** Plain text is a Guion with text but no border; it is visible, but not selectable, and not flashable, and not invertable.

**LISTBOX:** A ListBox is actually multiple Guions. A ListBox consists of a Border and several (10 in our case) ListItems.

**BORDER:** A Border is a Guion with a border but no text. It is visible, but not selectable, and not flashable, and not invertable..

**LISTITEM:** A ListItem is a Guion with text, but no border. It is visible, selectable, and invertable, but is not flashable.

Guions are capable of the following actions and behavior :

1. Draw: A Guion can draw itself.
2. Erase: A Guion can erase itself.
3. Select: How the Guion responds to being selected.
4. Flash: A Guion can flash itself.
5. Invert: A Guion can Invert itself.
6. SendCmd: A Guion can send its command code to the server

**OBJECT      GuiDescriptor**

**DESCRIPTION**

This is a data structure which contains all of the data needed to describe the attributes of a Guion. A GuiDescriptor's data completely specifies how a Guion will look and act. This data structure is convenient for loading and storing Guions as persistent objects from disk files or over a network.

---

**OBJECT      Screen**

**DESCRIPTION**

The Screen is an object which maintains a list of Guions and receives input from a mouse/touchscreen and keyboard. Based on the input received the Screen sends commands to the Guions in its list to cause them to Draw, Erase, Flash, etc.

---

**OBJECT      ClientScreen**

**ANCESTRY      Screen**

**DESCRIPTION**

The ClientScreen object is descended from the Screen so it is a type of Screen. In addition to being a Screen, the ClientScreen is capable of sending and receiving events (via various network objects outside the scope of these comments) to a Server. The ClientScreen does this in a portable manner so the object that it communicates with can be replaced. In this way the medium over which the Client/Server communication takes place can easily be changed to :

1. Various types of network protocols (TCP/IP, NetBIOS, NetBEUI, etc).
2. Various types of physical networks (Ethernet, Token Ring).
3. RS-232
4. Operating System Inter-Process Communications  
(Windows Messages, OS/2 Messages, X/MOTIF Messages, UNIX IPC)

## CLIENT / SERVER EVENTS

The rest of this document describes the various events which can take place between the Client and Server. The structure of each event describes the actual data being exchanged over the physical communication medium. The Client and Server software do not actually perform the communication, but they send/receive events from a Network object via inter-process communication. The Network objects do the communication over the physical medium. This inter-process communication may pass pointers where variable length data is concerned, whereas the actual data passes through the physical link.

### EVENT

### PosReq

DIRECTION SERVER -> CLIENT

### DESCRIPTION

Requests the position of a particular Guion.

### STRUCTURE

- |             |       |
|-------------|-------|
| 1. POSREQ   | (int) |
| 2. GUION ID | (int) |

### RESPONSE

PosData

**EVENT                      PosData**

**DIRECTION   CLIENT -> SERVER**

**DESCRIPTION**

Returns the position of a requested Guion.

**STRUCTURE**

- |                                 |       |
|---------------------------------|-------|
| 1. POSDATA                      | (int) |
| 2. GUION ID                     | (int) |
| 3.     UPPER LEFT X COORDINATE  | (int) |
| 4.     UPPER LEFT Y COORDINATE  | (int) |
| 5.     LOWER RIGHT X COORDINATE | (int) |
| 6.     LOWER RIGHT Y COORDINATE | (int) |

**RESPONSE**

NONE

---

**EVENT                      SETPOS**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

Sets the position of a desired Guion. This does NOT cause a redraw. The server will need to explicitly redraw this Guion, or send a general Screen redraw command to have the Guion displayed in its new location.

**STRUCTURE**

- |                                 |       |
|---------------------------------|-------|
| 1. SETPOS                       | (int) |
| 2. GUION ID                     | (int) |
| 3.     UPPER LEFT X COORDINATE  | (int) |
| 4.     UPPER LEFT Y COORDINATE  | (int) |
| 5.     LOWER RIGHT X COORDINATE | (int) |
| 6.     LOWER RIGHT Y COORDINATE | (int) |

**RESPONSE**

NONE



**EVENT**                    **CmdReq**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Requests the command value of a particular Guion.

**STRUCTURE**

1. GETCMD                    (int)
2. GUION ID                (int)

**RESPONSE**

CmdData

---

**EVENT**                    **CmdData**

**DIRECTION** CLIENT -> SERVER

**DESCRIPTION**

Returns the command value of a particular Guion.

**STRUCTURE**

1.    CMDDATA                (int)
2.    GUION ID                (int)
3.    CMD VALUE               (int)

**RESPONSE**

NONE

**EVENT                      SetCmd**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

**Sets the command value of a particular Guion.**

**STRUCTURE**

- 1. SETCMD                      (int)**
- 2. GUION ID                    (int)**
- 3. CMD VALUE                  (int)**

**RESPONSE**

**NONE**

---

**EVENT                      Usrcmd**

**DIRECTION   CLIENT -> SERVER**

**DESCRIPTION**

**This is a command sent to the server from the client by a Guion that was selected. It can occur at any time due to user action.**

**STRUCTURE**

- 1.        USRCMD                      (int)**
- 2.        GUION ID                    (int)**
- 3.        CMD VALUE                  (int)**

**RESPONSE**

**NONE**

**EVENT****TextReq**

DIRECTION SERVER -> CLIENT

**DESCRIPTION**

Requests the text string of a particular Guion.

**STRUCTURE**

1. TEXTREQ (int)
2. GUION ID (int)

**RESPONSE**

TextData

---

**EVENT****TextData**

DIRECTION CLIENT -> SERVER

**DESCRIPTION**

Reports the text string of a particular Guion. This event probably requires that a SetRcvLen message be sent first to allow the server to prepare for the reception of a larger number of bytes.

**STRUCTURE**

1. TEXTDATA (int)
2. GUION ID (int)
3. TEXT LENGTH (including NULL) (int)
4. TEXT (TEXT LENGTH bytes)

**RESPONSE**

NONE

**EVENT**                      **SetText**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Sets the text string of a particular Guion. This probably requires the server to send a SetRcvLen first to prepare the client to receive a larger number of bytes.

Note that this does not cause the Guion to redraw itself. The server will have to specifically send a Draw command to this Guion, or issue a general Screen Draw command to cause the new text string to be displayed.

**STRUCTURE**

- |                                 |                     |
|---------------------------------|---------------------|
| 1. SETTEXT                      | (int)               |
| 2. GUION ID                     | (int)               |
| 3. TEXT LENGTH (including NULL) | (int)               |
| 4. TEXT                         | (TEXT LENGTH bytes) |

**RESPONSE**

NONE

---

**EVENT**                      **FlagsReq**

**DIRECTION** SERVER->CLIENT

**DESCRIPTION**

Requests the attribute flags of a particular Guion.

**STRUCTURE**

- |                 |       |
|-----------------|-------|
| 1.     FLAGSREQ | (int) |
| 2.     GUION ID | (int) |

**RESPONSE**

FlagsData

**EVENT****FlagsData****DIRECTION CLIENT -> SERVER****DESCRIPTION**

Reports the attribute flags of a particular Guion.

**STRUCTURE**

- |    |                 |       |
|----|-----------------|-------|
| 1. | FLAGSDATA       | (int) |
| 2. | GUION ID        | (int) |
| 3. | ATTRIBUTE FLAGS | (int) |

**RESPONSE**

NONE

---

**EVENT****SetSelectability****DIRECTION SERVER -> CLIENT****DESCRIPTION**

Sets or resets the On/Off attribute flag of a particular Guion.

**STRUCTURE**

- |    |                   |       |
|----|-------------------|-------|
| 1. | SETSELECTABILITY  | (int) |
| 2. | GUION ID          | (int) |
| 3. | BOOLEAN SET/RESET | (int) |

**RESPONSE**

NONE

**EVENT                    SetVisibility**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

**Sets the visibility attribute flag of a particular Guion.**

**STRUCTURE**

1.     SETVISIBILITY                    (int)
2.     GUION ID                        (int)
3.     BOOLEAN SET/RESET            (int)

**RESPONSE**

**NONE**

---

**EVENT                    SetBorder**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

**Sets or resets the border attribute flag of a particular Guion.**

**STRUCTURE**

1.     SETBORDER                        (int)
2.     GUION ID                        (int)
3.     BOOLEAN SET/RESET            (int)

**RESPONSE**

**NONE**

**EVENT**                    **LTextOffsetReq**

**DIRECTION**   **SERVER -> CLIENT**

**DESCRIPTION**

Requests the Left Text Offset of a particular Guion.

**STRUCTURE**

1.    **LTEXTOFFSETREQ**                    (int)
2.    **GUION ID**                        (int)

**RESPONSE**

**TextOffsetData**

---

**EVENT**                    **LTextOffsetData**

**DIRECTION**   **CLIENT -> SERVER**

**DESCRIPTION**

Reports the Left Text Offset of a particular Guion.

**STRUCTURE**

1.    **LTEXTOFFSETDATA**                    (int)
2.    **GUION ID**                        (int)
3.    **OFFSET**                            (int)

**RESPONSE**

**NONE**

**EVENT**                      **SetLTextOffset**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Sets the Left Text Offset of a particular Guion.

**STRUCTURE**

1.     SETLTEXTOFFSET            (int)
2.     GUION ID                   (int)
3.     OFFSET                    (int)

**RESPONSE**

NONE

---

**EVENT**                      **Draw**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Commands the remote screen to draw itself.

**STRUCTURE**

1.     DRAW                    (int)

**RESPONSE**

NONE



**EVENT**            **Erase**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Commands the remote screen to erase itself.

**STRUCTURE**

1. ERASE      (int)

**RESPONSE**

NONE

---

**EVENT**    **GuionCountReq**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Requests the number of Guions attached to the remote screen.

**STRUCTURE**

1.    GUIONCOUNTREQ      (int)

**RESPONSE**

GuionCount

**EVENT**                      **GuionCount**

**DIRECTION** CLIENT -> SERVER

**DESCRIPTION**

Reports the number of Guions attached to the remote screen.

**STRUCTURE**

1.     GUIONCOUNT     (int)
2.     VALUE            (int)

**RESPONSE**

NONE

---

**EVENT**                      **KillAllGuions**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Commands the remote screen to delete all Guions attached to it.

**STRUCTURE**

1.     KILLALLGUIONS   (int)

**RESPONSE**

NONE

**EVENT                      AddGuion**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

Gives the remote screen a new Guion to attach to itself. The server will probably need to send a SetRcvLen first to prepare the client to receive a message of this size.

**STRUCTURE**

1.     ADDGUION                      (int)
2.     LENGTH OF DESCRIPTOR        (int)
3.     GUION DESCRIPTOR            (LENGTH bytes)

**RESPONSE**

NONE

---

**EVENT                      DelGuion**

**DIRECTION   SERVER -> CLIENT**

**DESCRIPTION**

Commands the remote screen to delete a particular Guion.

**STRUCTURE**

1. DELGUION                      (int)
2. GUION ID                      (int)

**RESPONSE**

NONE

**EVENT**                      **GuionReq**

**DIRECTION** SERVER -> CLIENT

**DESCRIPTION**

Requests the Guion Descriptor of a particular Guion.

**STRUCTURE**

1. GUIONREQ            (int)
2. GUION ID            (int)

**RESPONSE**

GuionData

---

**EVENT**                      **GuionData**

**DIRECTION** CLIENT -> SERVER

**DESCRIPTION**

Reports the Guion Descriptor of a particular Guion. The client will have to send a SetRcvLen message to prepare the server to receive a message of this size.

**STRUCTURE**

1. GUIONDATA                      (int)
2. LENGTH OF DESCRIPTOR        (int)
3. GUION DESCRIPTOR            (LENGTH bytes)

**RESPONSE**



## Appendix 1. Glossary of Terms

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<b>Administrator's Workstation</b>	A 486 PC with Paradox for Windows to provide database access via a graphical user interface.
<b>Admission, Discharge, Transfer System (ADT)</b>	The ADT will be unique to each hospital.
<b>Borland C++</b>	The C++ programming language compiler used for the Display Terminal Graphical User Interface (GUI) and the communications between the Display Terminal and the Data Base Server.
<b>Box Register</b>	A storage unit that records the addition or removal of a boxed item, usually but not limited to boxed catheters.
<b>Bytecraft C</b>	The C programming language compiler used for the Hook Register Controller microprocessor chip.
<b>Cartridge</b>	A pre-filled container that holds multiple medicines and can be loaded into a Medicine Dispenser Magazine.
<b>Procedure</b>	An occurrence of treatment for an illness or injury.
<b>Catheter</b>	<p>A tube passed through the body for evacuating or injecting fluids into body cavities. Catheters may be made of elastic, elastic web, rubber, glass, metal, or plastic. There are several kinds of Catheters that may be used by MedSelect's targeted market:</p> <ul style="list-style-type: none"><li>• <b>Arterial:</b> a catheter inserted into an artery to measure pressure or to remove blood.</li><li>• <b>Balloon:</b> a double-lumened catheter in which a balloon may be expanded by injecting air, saline, or contrast medium.</li><li>• <b>Cardiac:</b> a long, fine catheter used for passage through the lumen of a blood vessel into the chambers of the heart.</li><li>• <b>Central:</b> a catheter inserted into a central vein or artery for diagnostic or therapeutic purposes or both.</li><li>• <b>Central venous:</b> a catheter inserted into the superior vena cava to permit intermittent or continuous monitoring of central venous pressure and to facilitate obtaining blood samples for chemical analysis.</li></ul>
<b>Central Pharmacy</b>	A hospital pharmacy that controls and distributes all medication.
<b>Data Base Server</b>	A 486 PC running a Paradox Relational Data Base Management System (RDBMS) that provides Lantastic network communication with the Display Terminal. The Database Server also provides communications with the Hospital Information System (HIS) and the Admission, Discharge, Transfer system (ADT).
<b>Ethernet</b>	A 10-Base T (twisted pair), or RG58 (thinwire) network running Lantastic, TCP/IP, Novell, etc. for communication between the Display Terminal, AWS, and the Database Server.
<b>Graphical User Interface (GUI)</b>	A user-machine interface that supports variably sized text and graphics. The Display Terminal and the Administrator's Workstation both have GUIs.
<b>Hook Register</b>	Intelligent storage hooks containing PIC micro controllers that record the addition or removal of an item, usually catheters.

<b>Hospital Information System (HIS)</b>	The HIS will be unique to each hospital.
<b>Inventory Bus</b>	The 4-wire connection between IBPCs and the Inventory Controllers.
<b>Inventory Bus Protocol Converter (IBPC)</b>	A MedSelect custom interface board located in the Display Terminal. The IBPC provides communication between the Display Terminal and the Inventory Controllers.
<b>Inventory Controller</b>	A MedSelect custom interface board that communicates inventory functions to the IBPC in the Display Terminal. Inventory Controllers are located externally to the Hook Registers, Box Registers, and Manual Register, and inside the Medicine Dispenser. Each Controller is based on a Motorola 6805 micro processor.
<b>Location</b>	A place. Relevant examples are Cath Lab #2, Pharmacy, Nursing Station, and Room 305.
<b>Magazine</b>	A compartment within the Medicine Dispenser that holds individual medicine containers or pre-filled cartridges.
<b>Manufacturer</b>	A company that produces or fabricates a supply.
<b>Medicines</b>	<p>Packaged medication that is dispensed by the Medicine Dispenser. Examples of meds include:</p> <ul style="list-style-type: none"> <li>• <b>Liquids:</b> <ul style="list-style-type: none"> <li>- <b>Vials:</b> small glass bottles/containers</li> <li>- <b>Ampules:</b> small, sealed, glass containers that may contain sterilized substances (usually hypodermic solutions)</li> <li>- <b>Syringes:</b> instruments for injecting fluids into cavities or vessels</li> <li>- <b>Tubexes:</b> thin, pre-filled syringes</li> </ul> </li> <li>• <b>Solids: Tablets or Capsules</b></li> </ul>
<b>Medicine Dispenser</b>	Inventories and dispenses medicines and hypodermic solutions. The Medicine Dispenser contains magazines that can be loaded with individual Meds or with pre-filled cartridges that contain multiple Meds.
<b>Nursing Station</b>	The Display Terminal and associated inventory/dispensing units (may include Hook Registers, Box Registers, and Medicine Dispensers).
<b>Paradox</b>	The Relational Data Base Management System (RDBMS). Paradox also provides the Graphical User Interface (GUI) for the Administrator's Workstation.
<b>Patient</b>	One who is being treated for an illness or injury. Any individual receiving medical care.
<b>Physician</b>	A person who has successfully completed the prescribed course of studies in a medical school officially recognized by the country in which it is located, and who has acquired the requisite qualifications for licensure in the practice of medicine. An attending physician is a physician on the staff of a hospital who regularly cares for patients there.
<b>PIC</b>	A micro processing chip located in each Hook Register that recognizes the addition or removal of an item.
<b>PIC Bus</b>	Serial connections between Hook Registers and a Hook Register Controller.

<b>PTCA</b>	Percutaneous (through the skin) Transluminal (through a vessel) Coronary (heart) Angioplasty (balloon).
<b>SelectTrac-Rx</b>	A dispensing, tracking, and inventory monitoring system including one or more Medicine Dispensers (and possibly a locking drawer module), a Display Terminal, and an Administrator's Workstation.
<b>SelectTrac-CL</b>	A dispensing, tracking, and inventory monitoring system including one or more Hook Registers, Box Registers, Medicine Dispensers, Display Terminals, and Administrator's Workstations.
<b>Display Terminal (DT)</b>	An 80386 CPU with a flat touch screen monitor on COM Port 2 (COM2) that provides user access to all medical inventory supply functions and patient procedure data. The IBPC board is on COM Port 1 (COM1). The power supply in the display terminal powers all of the inventory control devices (hooks, hook controllers, box registers, manual registers, vial dispensers, electronic lock cabinets) as well as the display terminal itself.
<b>Supply</b>	A material or provision stored and dispensed as required. Relevant examples are a 7f Catheter and 500 mg Tylenol caplets.
<b>Supply Event</b>	An increase or decrease of a single unit of a supply at a supply position.



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